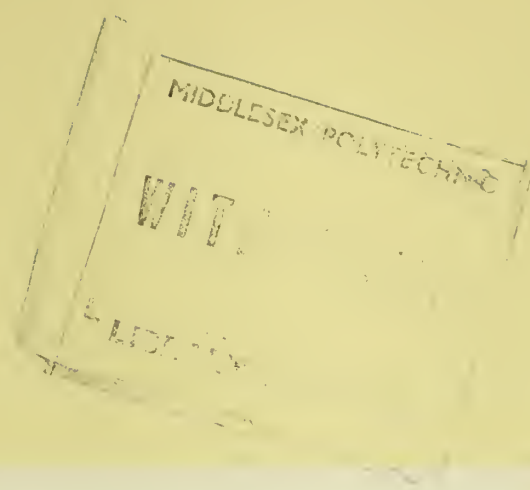




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THE BIRCH.



"Now spring has clad the groves in green,
And strewed the lea wi' flowers."

(EX : ROYAL ACADEMY, 1897.) *By permission of S. M. Ramsay L'Amy, Esq., the owner of the picture.*

THE BIRCH.



ALL the associations of the Birch tree are with open country, preferably the open country of the North of England, where it grows upon the edge of some wild moorland ; there the fragrance of its leaves mingles with the scent of the ling, and the call of the grouse or the solitary cry of the curlew alone break in upon the soft rustle of its foliage stirred by the breeze.

It will grow among the crags on a hill-side, in thin unprofitable soil, exposed to all the winds of heaven, in fact where scarcely any other tree could thrive. Yet the note of its character is essentially one of delicacy ; and from the smooth stem with its sweeping line and gradual curves, to the twigs that carry light leaf-stalks and dainty leaves, its gracefulness has no rival among forest trees.

The silvery trunk, furrowed and rough at the base, rises from a bed of bracken and seems to harmonise with the grey boulders near it. In places the thin papery bark peels away in circular strips round the stem, accentuating its rounded shape, and displaying the pink and yellow tints of an inner layer. The flowing line of the trunk is hardly interrupted by the lower branches, so few and slender are they, but continues upwards for two-thirds of the height of the tree, when it divides in slightly curved lines at an acute angle. This is the typical angle of ramification in the Birch, except in the lower and older branches, where it becomes rather more obtuse. The branches are long and clearly marked, and separate into lesser branches of a copper or chestnut colour, which bend downwards, and give off dainty polished twigs of purple brown. Placed somewhat apart on these pliant twigs, so that they are never dense enough to hide the branch

architecture, are the small triangular leaves, which hang on delicate pedicels, and twist and flutter with every passing breeze. Sometimes from the upper side of a pendent bough there springs a short upright branch that curves downwards after the fashion of a shepherd's crook. When the peats are stacked on the moors, sturdy little catkins, borne on the tip of every twig and very plainly seen, mark the time of year for the tree, and when the dead heather blooms make a russet carpet on the hills, patterned with crimson Bilberry leaves, the Birches too, in their veils of yellow, bear witness to the first frosts of autumn.

THE LEAF.

The leaves, even when fully developed, vary in size and shape, the triangular form being the most characteristic, while the leaf of



a young tree is usually larger than that of an old one. Two common forms are shown in the diagram. The upper side is dark green and shining, the under side dull, lighter in colour, and smooth, with the ribs showing clearly. The leaves are arranged alternately along the shoot,

in three rows, so that the first is in line with the fourth, the second in line with the fifth, and so on. This arrangement, however, is not noticeable in the spring time; then the young leaves, after leaving their first vertical position, spread horizontally, and appear to form a pair, the one directly opposite the other, with the fertile catkin



standing upright between. These young leaves are of a very fresh yellowish-green colour, and the blades are much wrinkled between the secondary ribs. As they expand and become darker in colour, the wrinkles disappear, and the two sides of the leaf-blade curl upwards from the main rib, which is itself curved back from base to tip.

The leaves are now separated from one another on the growing shoot, and increase to about one and a half inches in length. The blade flattens out, and they hang from thin, curved red-tinted stalks of more than half the length of the leaf itself. Though the summer tint of the foliage is a dark green, the polished leaf-surfaces seem to reflect the blue or grey of the sky ; early in the autumn they change to yellow.

THE CATKINS.

Male and female catkins are found on the same tree. The male catkins are formed during the summer, and remain on the tree throughout the winter months. They grow in pairs (sometimes singly, sometimes in groups of three) at the ends of the slender twigs, and their habit of standing out from the twig (< shaped) which supports them renders them very conspicuous.

By the middle of April they have grown to one or one and a half inches in length, and become pendulous, while their red-brown colouring affects the appearance of the tree nearly as much as do the young leaves; they are now mature and shed quantities of pollen. At this time of year the female catkins, though more numerous, are less noticeable, and appear merely as small thin spikes of green, standing erect between the pairs of young leaves. Later on the colour of the stigmas gives them a reddish tinge.

CONSTRUCTION OF THE CATKINS.

THE MALE catkins are compact, cylindrical in form, and pointed. Each catkin consists of a central axis, round which are arranged a number of bracts or scales. These overlap one another so long as the catkin is immature, but become separated in time by the elongation of the axis to which they are attached. Every scale bears on its inner side three florets; the florets have two stamens apiece, each with a forked filament; this gives the appearance of there being twelve stamens below each scale. When the catkin is ripe the stigmas project all round the scale.

THE FEMALE catkins are invisible during the winter, hidden under the scales of the lateral buds on the branch which terminates in the male catkins. As the buds open, and the leaves unfold, the catkins





become evident at the tip of the short newly-formed branch. They are similar in shape to the staminate catkins, but are always smaller (about half inch long). The scales in their case are three-lobed, and beneath each scale are three female flowers, which consist of an ovary with stigmas. After fertilization these catkins grow rapidly, becoming an inch long and a quarter of an inch or more broad. By the end of the summer the fruits are ripe and the catkins begin to break up, the scales and fruits falling away from the axis, which is left bare. Each fruit is small and flattened in form, and is furnished with a pair of membranous wings to facilitate its dispersal by the wind.

THE BIRCH (*Betula Alba*).

The Birch is able to endure considerable heat and a greater extremity of cold than any other tree, for it is found farthest north, at a latitude of 70° . We are told that it is the only species of tree in Greenland, and a common inhabitant of Russia and Siberia. In the more northern climates, however, it becomes dwarfed to a mere bush.

It is a fast-growing tree, and reaches its full height of from forty to fifty feet in as many years. The roots take firm hold upon the soil, and have great powers of penetration.

Occasionally one may see a young tree growing from the top of a crag; its roots encircle the stone and draw their nourishment from the earth beneath it; or again the rock itself is sometimes split by the growth of the roots which have thrust themselves into its crevices. The branches can withstand high wind, for they offer little resistance (owing to their thin foliage and small leaf-surface), but yield and sway with the force of its attack.

The Birch grows best in light loam, but thrives even on a poor soil.

Its Uses. The Bark is more enduring than the timber, and it is used for tanning Russia leather. In Lapland houses are roofed with it.



BIRCH TREE.

THE ELDER.



ELDER-BERRY TREE.

THE ELDER.

GENERAL REMARKS.

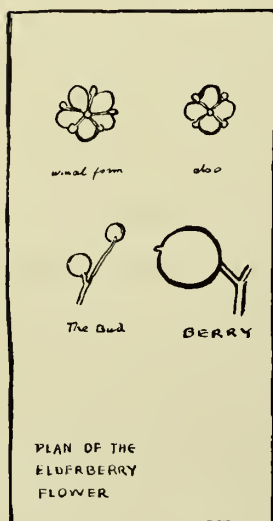


THE Elder attracts attention at all times of the year. The grey-green tufts of its opening leaves, like the downy silver buds on the goat willow and the first golden celandine, come rather to show that winter is past than as tokens of spring's arrival. In summer its large leaves and strong new shoots are conspicuous in the hedgerows, even before the display of its white heads of blossom. In autumn the shining black berries massed together on crimson stalks, or the pale yellow of the fading leaves, form a fine contrast to the scarlet fruit of the Mountain Ash, Guelder Rose or Hawthorn, and the crimson tints of their foliage. The Elder is a denizen of cottage gardens, where it shares with the holly and the rose-bush, with marigolds, monkshood, snap-dragon and a host of old-world flowers, that power to charm which comes of old association. It provides the cottager with his wine, and is no less a favourite with the children, who for generations past have used the hollowed tubes of its young shoots to supply themselves with whistles and popguns.

THE FLOWER.

The male and female organs are contained in the same floret. The flower stem grows from the apex of the shoot, in a line with it, and from this stem radiate the main flower stalks (*i.e.*, a central stalk and two opposite pairs set like a cross), which in their turn divide

and sub-divide again into numerous tiny pedicels. On these the florets are supported and grouped together into a loosely formed disk (corymb) some five inches in diameter. The florets have five creamy white lobes, resembling petals, springing from the rim of a short calyx tube and set at right angles to the flower pedicel. These lobes are in the same plane as the stamens which lie between them. The white thread-like filaments of the stamens bear bright yellow anthers, and help to make up the predominating colour of the head of flowers; the sepals are pale green. Occasionally the florets have four petals, four sepals and four stamens. The flowers are strongly scented.



THE BERRY.

The berries are nearly spherical, and about an eighth of an inch in diameter. They gradually change in colour from green to dull red, and then, very rapidly, pass about the middle of September to shining black, by which time the pedicels also have become crimson. The clusters of berries are set at first in the same position as the flower-heads, but, as they ripen, their own weight causes them to droop, and even to bear over the main flower stem with them.

THE LEAF.

When the bud expands, the first pair of leaves remain upright, but, as they lengthen, they separate and unfold outwards; the leaf-stalk also curves until it brings the tip of the terminal leaflet to a level with its own base, or even slightly below it. The second pair of leaves stand upright between the bases of the first pair, but at



THE FLOWERS.

THE FLOWER BUDS.



THE BERRIES.

right angles to them, so that when they in their turn spread, they find room in the unoccupied and alternate spaces between the leaves which opened before them.

The flower-bud, in the form of a tiny dull purple-red pellet, grows from the base of the second pair of leaves. The form and size of the full grown leaf is shown in the drawing.

In the newly-opened leaf the two outer leaflets bend from base to tip. The main leaf-stalk is also curved, and the blades of the leaflet on either side of the rib are inclined upwards; older leaves usually present a perfectly flat surface. The leaf generally consists of two pairs of leaflets and a terminal leaflet; occasionally one or three pairs are found. The leaflets grow on short stalks, attached to the main leaf-stalk on opposite sides, and in the same plane with it.

The main leaf-stalk starts from the twig in an upward curve.

The leaves are of a very pure green with a dull surface, the under side paler and of a bluer tint than the upper: the ribs are very apparent on the under side. In autumn the leaf turns pale yellow, and in some districts takes richer tints of red and purple.

RAMIFICATION.

By the time summer comes a new Elder shoot has grown to about a foot in length, and has put forth two pairs of opposite leaves and a head of flowers.

The flower stem is in a line with the shoot, and springs from its apex, where the first pair of leaves are situated. The second pair grow at right angles to these, lower down on the twig. The following season the old shoot is not prolonged from the apex which gives forth the flower stem, but a new shoot appears in the place previously occupied by the leaf-stalks. The shoots spring from the



PLAN OF LEAF.

old twig in the same plane with it, and at a curve very like that formed by their predecessors, the leaf-stalks: between the pair nearest the apex of the old shoot, is seen the stump of last year's flower



SKETCH OF AN
ELDER TRUNK.

stalk. This manner of growth results in a series of forks, two or three-pronged according as they occupy the upper or the lower place on the twig: it is the normal type of ramification in the Elder, but irregularities occur from various causes. The buds are fragile and

very easily broken away ; others fail to develop ; or again, adventitious shoots and suckers spring from the parent stem and grow to as much as six feet in length during the year, producing an indefinite number of leaves. The lower portion of the main stem is usually straight for some distance above the ground, owing to the rapid growth of the young plant before it bears flowers.

The young shoots are ribbed, sometimes angular and of a pale green colour ; towards the end of the summer they turn greenish-grey, and later acquire a red tint. The stems are often studded with small projections (the breathing holes of the inner bark), which gradually spread till they form seams at intervals on the branches, deepening into furrows, irregular and lozenge-shaped, in the old wood.

The dead bark on old trees is cork-like in substance, and is packed closely round the forks of the stem, concealing the angles, and giving a swollen appearance to the joints.

THE ELDER (*Sambucus nigra*).

The Elder will grow under almost any conditions, though it prefers a damp soil. It rarely exceeds twenty feet in height and is more often found as a bush only half as high. The young plants spring up in large quantities from the seed which falls under the tree, and grow with great rapidity. The leaves of some cultivated varieties are variegated in colour. Another species (*laciniata*) is remarkable for its delicate leaves, which are deeply lacerated.

THE WHITEBEAM.



WHITEBEAM FLOWER.



THE WHITEBEAM.

GENERAL REMARKS.



THE charm of endless variety is to be found about the growth of trees of different species, in every part, in every stage, at every season of the year. The posture of the buds and young leaves, and its gradual modification, is one among many unvarying causes which affect the appearance of the trees in Spring, and give to each its individual character.

The young leaves of Elm, Beech, Lime, and Hazel, for example, are found drooping from the twig, and the partly opened leaves of the Horse Chestnut and Sycamore, though so differently arranged, take up the same position. The newly unfolded leaves of the Whitebeam, on the contrary, stand bolt upright, irrespective of the angle of the twig which carries them. On the horizontal twigs, with which they form a right angle, they are naturally most conspicuous, and not the less so for their coating of white felt.

THE WHITEBEAM (*Pyrus Aria*).

The Whitebeam rarely exceeds 20 feet in height, and the main stem can easily be distinguished throughout. The new shoots are covered with white down, but the rest of the branches and the trunk are smooth and of a dark silver-grey. The lower branches spread horizontally, and are borne down by the weight of the fruit. The higher ones necessarily have more of an upward tendency, and do not extend far from the trunk: this gives the tree a pyramidal outline. The unusual whiteness of the leaf-blades, on the under side, and the size of the leaves, make the tree conspicuous, even from a distance. This is especially the case when it grows on a hill-side, or when



BRANCH OF WHITEBEAM
WITH BLOSSOM.

the leaves are turned up by the wind. The profusion of blurred white blossom and the unusual form of the fruit are also remarkable. The tree is fairly common in chalk and limestone districts.

THE FLOWERS.

The buds which contain flowers as well as leaves are larger and rounder than those which contain leaves only. About the beginning of May the protecting leaves diverge, and disclose a mass of round white floret buds, packed tightly together, and supported on a stout pedicel, which is also white and downy. With the lengthening of the pedicels the flower-buds are enabled to separate, and by the middle of May they form a corymb of many white flowers, all fully out. Each floret has five rounded white petals, about a quarter-of-an-inch long, concave and set at right angles with the central pistil. The stamens, twenty in number, which radiate from the centre of the flowers, rise in the angle between petals and pistil, and consequently project beyond the surface of the head of flower, and give a blurred look to its outline; while their yellow tips also affect the appearance of the blossom when seen from a distance. The main flower-stalk branches into smaller pedicels, and on still shorter tributaries of these the florets are borne.



THE FRUIT.

Soon after the fruit is formed the stalk becomes pendent, owing to its added weight. The fruit is a rounded oblong in shape, half



FLOWER AND
LEAF BUDS.



A FLOWERING BRANCH.

to three-quarters of an inch long, shining and smooth except where dark rough dots on the surface make it feel rough to the touch.

The styles are dark in colour and conspicuous: the stalk is green tinged with red.

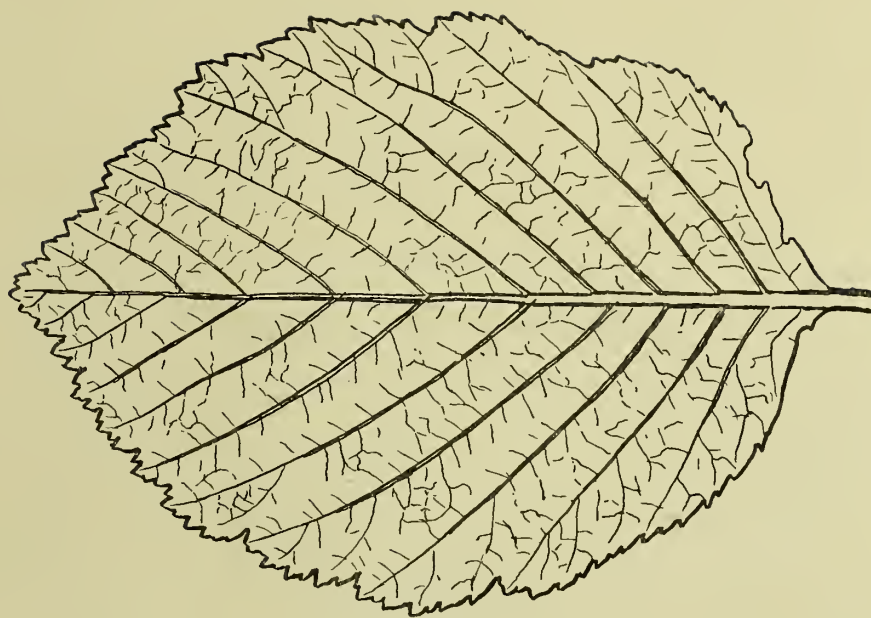
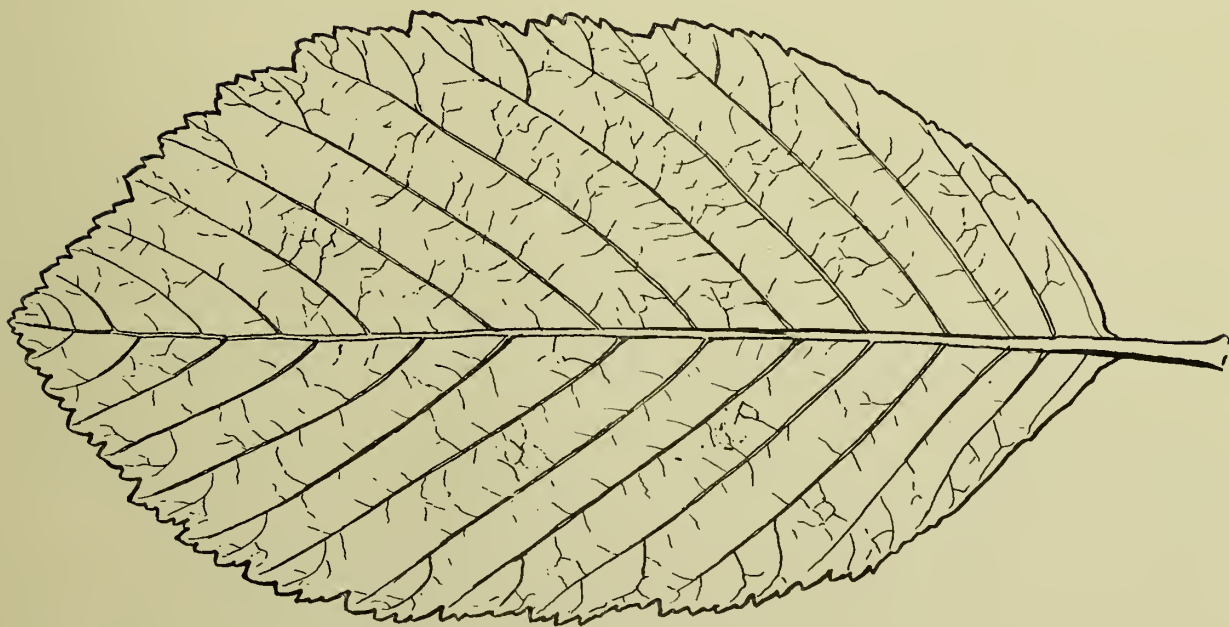
THE LEAF.

Late in the autumn the leaf-buds are about a quarter of an inch long, pointed and covered with smooth green scales. By the end of April the leaves have thrust their way out at the tips, and stand about an inch high, the outer ones enfolding the inner. They are coated with white felt, under which a tinge of pale green presently appears, while the outer ring of leaves, without losing their spoon-shaped curve, begin to lean away from the inner; they are supported on stout white petioles. The ribs on the under side show clearly, and the protecting



THE FRUIT
(The Natural Size).

scales still cling to the base of the stalks, bearing traces in their brown tips of the winter's exposure. The whiteness of the upper leaf surface is soon changed for a summer habit of dark shining green, which grows yellow at the touch of autumn, while the lower surface becomes faintly tinged with green. The fully-developed leaf lies horizontally, or is inclined upwards: the edges of the blade are usually turned up, or the whole curved from base to tip. In substance it is thick and coarse, and puckered by many prominent veins. The leaf-stalk measures from one to two inches in length.



PLAN OF LEAVES.

ALDER BUCKTHORN.

GENERAL REMARKS.



CROSS the common runs a deep-cut sandy lane. The crest of heather and bracken which overhangs its shelving sides of bright orange sandstone forms eaves of still more brilliant colouring, for they are lit from below by the hot light reflected from the roadway. Under them some panting sheep find shelter from the white heat that quivers over the vast stretch of table-land. The palpitating air robs the line of distant hills—even the sky—of all their colour. The only sounds are the cracking of the ripe seed-pods of the gorse, the slight rustle of a grass snake, the constant hum of insects. The only movement is the flutter of the gay crowd of butterflies above the flowers. Where bushes of Alder Buckthorn line the roadway, their shapely leaves are silhouetted against the sky, with here and there a flower or a berry. The berries are newly-formed and pale. To find them black and ripe, you must wait till summer heats are past, and the hills stand out clear again under the blue and green lights of an autumn sky—till the heather has blossomed and the bracken is yellow. And, later in the year, the wintry sun will cast an image of the stems, on which a few leaves still remain, in bright blue shadows on the frosted ground, while the rime glitters on every twig.

BUCKTHORNS.

There are two species of Buckthorn—the Alder Buckthorn (*Rhamus Frangula*)—also called the Breaking Buckthorn, and the Spine-bearing Buckthorn (*Rhamus Catharticus*). The latter sometimes forms a small tree with a trunk of perhaps seven inches in diameter. The Alder Buckthorn is always of slighter build, and seldom exceeds the dimensions of a bush.

The Alder Buckthorn is fairly common as a shrub or small tree in woods and waste places. It rarely exceeds ten feet in height when fully grown, and in open spaces will bear flowers and fruit when only two feet high. Its chief distinction is in the unusual form of its leaves, which are attractive in texture and colouring.

THE BRANCHES.

The stem and branches are slender, and form long sweeping lines, directed upward and clearly marked ; for they bear but few twigs, and these carry most of the leaves near their extremities. The stem and the older branches are coloured a very dark dull grey, the young shoots pale green, tinged with red on the surface most exposed. By the autumn these shoots have turned to a dull purple.

THE FLOWER.

By the end of June the blossom is fully out. The flowers grow on the young shoot from the axil of each leaf, in groups of three or four. The pedicel is about half an inch long, pendent and of a delicate green. On its extremity it carries the tiny blossom made up of five small white petals, finely pointed and united to within a little of their tips by a pale-green cup-shaped calyx, which, seen from a distance, gives to the whole the appearance of a green flower.

THE BERRIES.

The berries are usually set singly, or in pairs, in the leaf-axils, where they replace the groups of flowers. At first their colour is pale-yellowish green, but this changes about the middle of August to rose-colour or crimson (the parts most exposed being the first to



ALDER BUCKTHORN—FLOWER.



BERRY OF
ALDER BUCKTHORN.



reddden), and, by the end of the month, to black. The berries are hard and smooth, nearly round, and about a quarter-of-an-inch in diameter.

THE LEAF.

The leaves resemble those of the Alder in shape, sometimes even displaying the characteristic indenture at the tip. With the similarity of shape the likeness ends, for the leaves of the Buckthorn are smaller, unusually smooth on both surfaces and of a very soft texture; again, the leaf-blade is remarkably flat, suggesting a leaf that has been pressed, while the regular pattern formed by the first and secondary ribs is indented, as if stamped upon the upper surface, and projects like whipcord from the under surface, the rest of the veining being scarcely discernible. The upper face of the leaf is of a rather dark bluish-green colour, and quite smooth; the under one of a yellowish-green, with a reflective surface which often acquires a tinge of blue. The edge forms a wavy line, although it is not serrated. The leaves are arranged singly, though sometimes they appear to be in nearly opposite pairs, from three to six in number; they are set near the extremity of the twigs on pale-green stalks, which are tinged with red on the upper side.



PLAN OF ALDER BUCKTHORN LEAF.

THE BUCKTHORN.



HOUGH linked together in name with the Alder Buckthorn, the Buckthorn (*Rhamus Catharticus*) differs from it in many essential features, and the connection leads to comparisons which are on the whole to its disadvantage.

The perplexing tangle of its numerous twigs, and its rough branches stunted and armed with thorns, contrast unfavourably with the free growth and suppleness of its namesake. Its leaves are coarser and less shapely, and often huddled together in bunches, owing to the arrested development of the twig, instead of being fairly spaced along it. The leaf-blade is of less pleasing texture, and its edges are serrated instead of being unbroken. The flowers are produced in dense clusters, in which detail is lost, instead of growing singly, and they have the somewhat unusual number of four instead of five petals to differentiate them still further from those of the Alder Buckthorn. The black, richly coloured berries, however, make a goodly show, and their peculiarity of form (they are flattened at the base) saves them from being commonplace. In form, the Buckthorn is a spreading bush or tree, rarely exceeding ten feet in height.

THE FLOWER AND FRUIT.

The Buckthorn blossoms in May. The male flowers usually grow on one tree, the female on another. Although the flowers form dense clusters round the axils of the leaves, each one has a separate stalk about a quarter of an inch long which springs directly from the twig. The male flowers have four pointed petals, arranged at right angles to the calyx tube. These petals are roughly

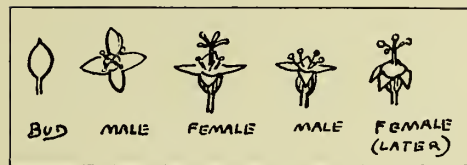


FLOWER AND FOLIAGE
OF BUCKTHORN (Catharticus).



BRANCH WITH BERRIES
(*Rhamnus Catharticus*).

(Notice the arrested Twigs and the resemblance the Berries bear to boot buttons).

PLAN of BUCKTHORN (*Catharticus*) FLOWER.

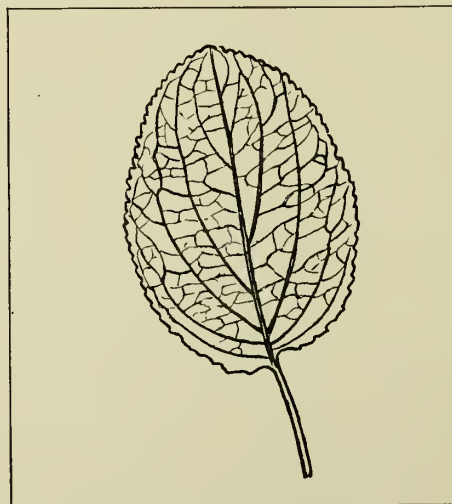
triangular in shape, and coloured a yellowish-green; four stamens pointing upwards alternate with the petals. The female flowers are of similar construction, but the four stamens of the male are replaced by an ovary, with a four-branched stigma. The general form of the fruit is that of a sphere a quarter of an inch in diameter, with a section as it were sliced off, so that where the stalk is inserted the berry is flat. The young berries change from green to dull red, and about the end of August, when they are fully ripe, become soft and juicy and of a very glossy black.

THE BRANCHES.

The shoots usually end in a thorn, and growth is continued from the uppermost pair of lateral buds, so that a fork is the result, the thorn making as it were a third diminutive prong between the two outer prongs or branches. Below the fork are other pairs of branches—some well-formed, others stunted—all alike bearing traces, in wavy well-marked rings, of the leafage of former seasons. The twigs are numerous, and set close together; they are clumsily formed, and taper off abruptly to the terminal thorn or bud. The newly-formed branchlets are a pale bronze, or reddish-green colour; those of last season are red-brown and smooth, while the older wood is rough and of a very dark and dingy grey.

THE LEAF.

The leaves grow in pairs, either opposite, or one slightly below the other on the shoot; each pair is arranged at right angles to the pair above it. The leaf-blade is wavy but not puckered, and quite smooth on both surfaces; the upper side is slightly glossy and darker than the under side. The edges are turned up and finely serrated; and the whole leaf is curved round from base to tip, while the point is generally slightly awry. The main and secondary ribs are clearly marked as indentations on the upper and projections on the under side; and the smaller veins make a pale-green network over the leaf-blade when it is held up against the sky. The leaves are a fresh yellow-green in colour, and soft to the touch. They measure about one-and-a-half inches in length, and the foot-stalks which bear them are about half as long. The foot-stalks have a groove on the upper side, running their whole length. The twigs are very short, and the leaves are arranged upon them in clusters, in the centre of which the small, pointed red-brown buds are to be found.



THE WALNUT.



BOLE OF WALNUT-TREE.

THE WALNUT.

GENERAL REMARKS.

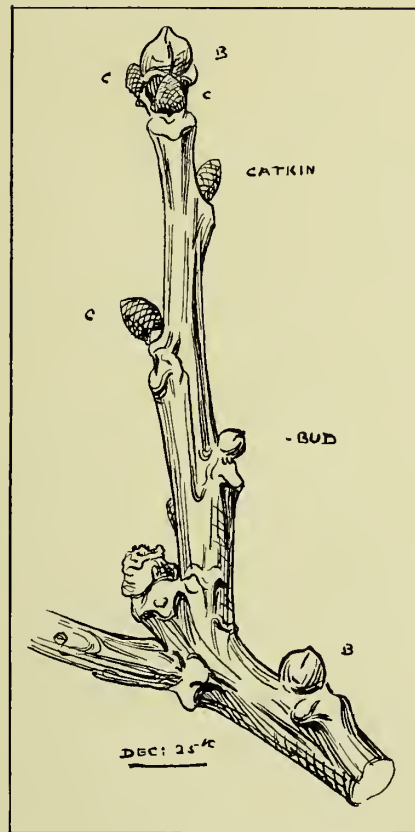


AMONGST the pleasant things which draw us back, year by year, to certain familiar places in the woods, is the scent of growing things, each of which is the essence of some one or other of the seasons, and from each of which the spirit of association is distilled. The sweet balsam-scent of the Poplars belongs to the plantation below the wood, where the spongy soil is intersected by water ditches. The place is one of Nature's gardens, and it is freshly filled every season with anemones and king-cups, primroses, champions and forget-me-nots, no less fragrant than the Poplar-buds, while the undergrowth is tangled with honey-suckles. It seems but a short time since the Poplars, which now make a forest of delicate spires far out of reach, were no higher than a man's hand. There is change in this respect, but otherwise the pastoral of the seasons is repeated continually and with but little outward variation. Every spring the blackbirds call loudly and persistently through the lengthening evenings: year in year out the birds choose the same trees for their nesting-places, and the wild garden is full of the same flowers. The little waterways lead to the swamp below, where Alders have been set to reclaim the waste to more useful purposes than can be served by its present carpet of vivid green, adorned with the beautiful star-clusters of the white garlic, beautiful to the eye, but no fit flowers for a nosegay, with their pungent smell. Although it is not the sweets alone which have their associations: rank and sour as the nettles are which luxuriate under the rookery hard by, they recall the hot summer

days when one beat the hedges beneath which they grew, with net and stick, for moths and butterflies. More pleasant to the sense is the subtle perfume of the young beech leaves, which one cannot disassociate from the freshness of the bluebells growing beneath them. And the trees have sweet scented blossoms, as well as fragrant buds and leaves; the Holly flowers, the Bird-cherry, the honey-scented Lime, and more sickly and intense under the hot suns of later summer, the cream-white clusters of the Elderberry and the Mountain Ash. The flavour of autumn haunts one with the gentle melancholy that belongs to dying leaves, and to the earth damp with the late rains. Yet, even wintry sunshine can bring out the resinous sweetness of the Pine woods. Apart from the associations of the seasons are those of places. The pleasant acrid scent of the Walnut leaf recalls the homestead, and brings the recollection of farm-yard sounds. One hears again the lowing of the milch cows, the shrill "ping-ping" of the milk first drawn against the sides of the empty can, the deeper sound as the pail filled, and the faint "swish-swish" when it was near to brimming. In the "mista" the young calf bellows for his supper, and the rooster flings a last challenge to its rival. In the autumn men and boys with ladders and long poles will beat down the walnuts, in their bruised green cases, and gather them in with the other fruits of the earth.

THE TWIGS AND LEAF SCARS.

The thickness of a Walnut twig is remarkable. When the shoot is newly formed its colour is either a bright shining green streaked with red or an olive-green. At a later stage it either retains this olive tint or looks both in colour and in texture as though it had been cast in bronze. The old twigs often carry traces of the



leaves of former seasons in conspicuous scars. Each scar consists of a bracket with a flat, pale-brown surface; its outline is scalloped into three lobes, the whole being roughly heart-shaped. The outermost lobe projects considerably from the surface of the twig, upon a support which merges gradually into the twig. The three-lobed form of the bracket leaves a hollow space, or deep fluting, on either side of this support. The leaf-scars on an ash form brackets of the same kind, but there the top surface has a semi-circular outline, and there is consequently no space for the flutings between the support and the main twig. Moreover, the brackets on the ash are arranged in opposite pairs, and the portion of the twig which lies between each pair is flattened. With the Walnut, on the contrary, they are arranged singly,

and at isolated and not opposite points. As a result the twig may be alternately rounded on the one side and fluted on the other. Other formations which occur round these scars may be studied in the diagram. Irregularities on the surface of the twig are sometimes due to the multiplicity of buds, which is a feature in the growth of the Walnut. Little raised dots arranged in series will be noticed on the surface of the leaf-scars: on the outermost lobe they take the form of a horse-shoe, and on the inner lobes they form a circle. This may appear a fact so trivial as hardly to deserve comment, but these dots on the leaf-scars are one of the lesser means of recognising a tree in the leafless season. They are the traces left by the fibres of the leaf-stalk which has passed into the twig, and their arrangement is no less characteristic than is the shape of the scar, which represents the plan of the base of the leaf-stalk. In some trees these dots are placed singly, so as to form an outline pattern, in the Ash a horse-shoe, in the Horse-Chestnut the lower half of an oval. The scars of other trees bear these vascular dots in three groups, and each group forms a pattern; the Walnut, the Chestnut, and the Oak are examples of this class. A common arrangement, shown by the Birch, the Willow, and other trees, is that of three single dots: in other cases the dots are united into crescent or V-shaped forms. Although many trees produce leaf-scars furnished with the same number of dots, the shape and size of the scar is usually helpful in differentiating any one tree, for, as has been said, it preserves a record of the basal shape of the leaf-stalk, the peculiar form of which is often easily recalled.

These leaf-scars must not be confused with the rings of scars to be found round twigs, and especially noticeable where the growth is dwarfed. These are a record of another kind: they represent the bud scales of past years, and consequently furnish a means of gauging the



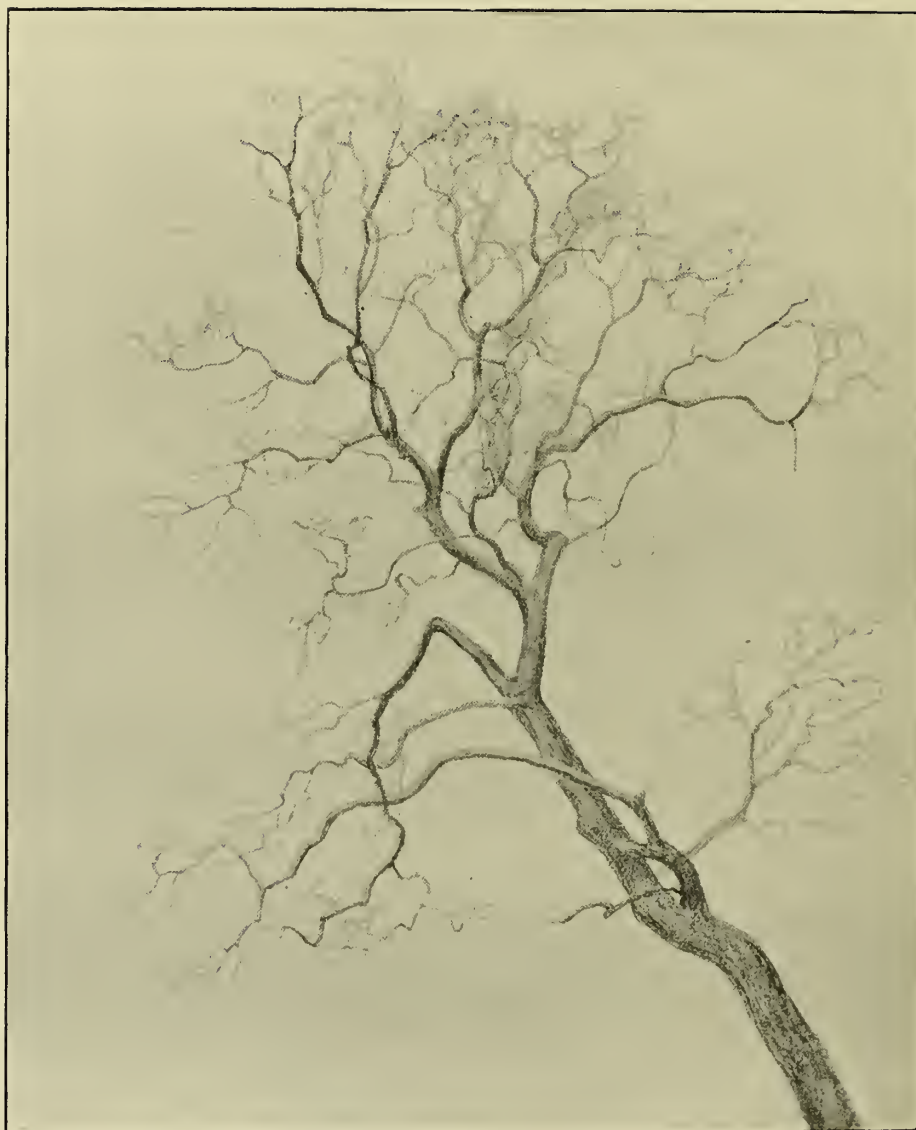
THE WALNUT.

age of a twig. Examples have already been given and depicted of the formation of both leaf and bud scars upon dwarf twigs: they are very conspicuous in the forked terminal shoots of the Sycamore, and on the dwarfed shoots of Apple, Blackthorn, Cherry, and Pear. Walnut twigs are also marked by small raised patches of a paler colour—these are the “lenticels,” which answer much the same purpose as the pores of the human skin. They are also very noticeable in the Horse Chestnut and Mountain Ash amongst other trees, but hardly discernible in the Firs and the Larch.

Our power of recognising a bare tree from a distance does not only depend upon the construction of its branches, their number, direction, definition, and comparative size with respect to the trunk, but also on such smaller matters as the thickness of the twigs and their closeness. The importance of this is brought home to an observer when trees are seen in the uncertain light of the moon or at day-break. At such times the outline of a Birch or Beech is blurred by the number of the twigs; they form a haze indistinguishable from the sky, while the stout shoots of a Walnut, Ash, or Horse Chestnut stand clearly silhouetted against it.

THE BRANCHES.

The olive-green and bronze of the young twig changes to a pewter-grey on the branches, which are rather smooth. The boughs are covered with a rougher grey bark: the bark on the trunk is scored by vertical lines, and by less deeply marked horizontal cuts, varied by incisions enclosing diamond-shaped patches of bark. The large number of abrupt curves in the branches and twigs—less sharp than in an Oak, more abrupt than in a Plane—makes the tree easy to recognise. These may be attributed partly to arrested growth at



BOUGH OF WALNUT.

the apex of the shoot where the flowers are borne, partly to the brittleness of the twigs, and to the tendency of the leading shoot to die back from the effects of frost, an accident to which, in the opinion of many gardeners, the Walnut is peculiarly liable. Old Walnut trees lose a considerable number of their branches. This habit of becoming "stag-headed" is all the more noticeable, because the main boughs are few in number, and usually divide from the trunk at a short distance above the ground, and spread gradually outwards as they ascend. Consequently the loss even of a few branches leaves great gaps at the top of the tree, and the long lines of the pale-coloured boughs are but scantily concealed.

THE LEAVES AND THEIR DEVELOPMENT.

The buds are dome-shaped, and covered by small dark scales. When they open enough to show the inner scales and the tips of the leaves, they appear of a dusty grey-green colour. Inside the scales are stipules which take the form of a flattened stalk, with rudimentary leaf-blades at the tip.

They spread out like a cross at the base of the upright young leaves with their dull red colouring. Each leaflet is folded in half along the mid-rib, and all lie as close together as the fingers of a hand open but not outspread. Gradually they move away from one another, and are spaced along the main leaf-stalks which spread outwards from the supporting shoot, and which are continually lengthening. The younger leaves at the apex of the shoot are still upright.

By the middle of May the bud-scales have fallen, and the stout young shoot has grown some inches above the flat green stipules that still cling to its point of junction with the twig. The resemblance between these stipules and the true leaf-stalk is very marked. The



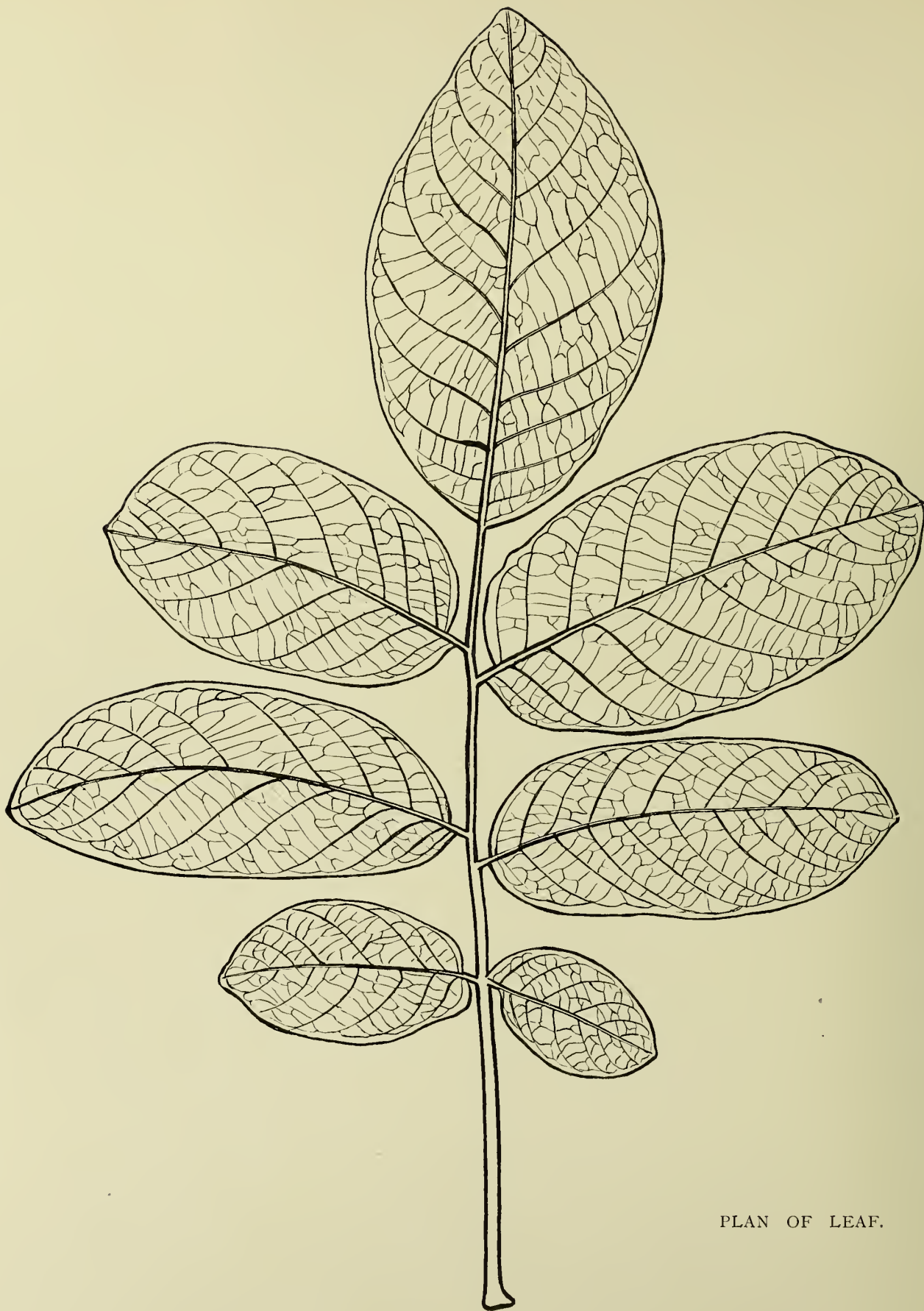
AN ILLUSTRATION OF THE LIKENESS
SOME STIPULES BEAR TO LEAVES.
(Not a twig of Walnut.)

leaf-stalks are so flat and so supple that they bend under the weight of the leaflets, which by now have become nearly flat. The young shoot is a bright shining green, and already slightly furrowed. On the young leaflets, when they were still folded in half and only their backs were visible, the projecting ribs could plainly be seen. Now they have expanded, the pattern of pale green veins on the upper side looks very gay when the light shines through the red-tinted leaf-blades.

The main rib of the fully developed leaf lies nearly horizontally, with the leaflets slightly drooping on either side of it.

The leaflets have a somewhat waved edge, but the blade is not puckered, and the two halves either lie in one plane or form two twigs slanting outwards from the rib. The colour in summer is a dark, yellowish-green, distinctly marked off into sections by the main ribs, the curved secondary ribs, and a network of smaller veins, which are all of a lighter shade. The underside is also of a paler green. The rib is naked for a small space only between the base of the leaflet and the main leaf-stalk.

The base of the leaflet is often irregular; the two portions of the blade do not meet the central rib at the same point, but one margin extends further along it than the other. The ribs of the leaflet lie nearly at right angles to the main leaf-stalk: the leaflets themselves are arranged in pairs nearly opposite. In number they vary to some extent: three pairs with a terminal leaflet are very commonly found. The basal pair are the smallest; the leaflets above usually increase in size in a regular progression, the terminal one reaching as much as five inches in length with a width of three inches. The whole leaf is about twelve inches long by ten inches in width, measuring from tip to tip of the widest leaflets. The



PLAN OF LEAF.



YOUNG MALE CATKINS AND OPENING BUDS.



Male Catkins
May 22nd

MALE CATKINS LATER.



FEMALE "FLOWER"
AND YOUNG LEAVES.



THE FRUIT.

main leaf-stalks are set variously at acute, obtuse, or right angles on the twig, and are much swollen at the point where they join the twig. In the upper part of the swelling there is a recess neatly hollowed out in which nestles the new bud. The leaves are arranged singly (not in pairs) on the twig.

MALE CATKINS.

The male and female flowers are borne on the same tree though placed apart.

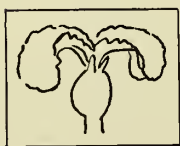
The male catkins are produced in the axils of the leaves, and by the end of the year their resemblance to little cones makes them conspicuous on the bare twigs. They stand away from the twig, and the diagonal cross lines with which they are marked, as well as their form, distinguish them at once from the fuller-shaped leaf-buds.

By the middle of April, when the leaf-buds are just bursting, the catkins are nearly an inch long—tapering, cone-shaped, and covered with little triangular scales. Their colour is a dull but not dark green. They now stand well out from the twig, a month later and they have grown to nearly two inches in length, and expanded to half an inch in diameter, and now begin to bend over. Meanwhile the leaf-buds have produced new shoots, with their complement of half-grown leaves and withering stipules. The catkins soon become pendulous, and covered with bright yellow pollen.

The catkins consist of a main axis, to which are attached on all sides numerous bracts. Fused to each bract are five scales enclosing a group of many stamens. The five scales might be more correctly described as three perianth leaves (sometimes two or four) and two lateral bracteoles.

THE FEMALE "FLOWER" AND FRUIT.

By the end of May the new shoots are furnished with leaves of considerable size, and the male catkins are dying and falling from the tree. Now the beautiful female flowers appear in their places at the end of the shoot, usually in pairs. The flowers are borne on a short



stout stalk, and consist of an ovary, enclosed in a brown calyx with a tapering neck, from either side of which project two large re-curved stigmas. The stigmas are of a fine spongy texture ; in some species they are white in colour, in one case rose-pink.

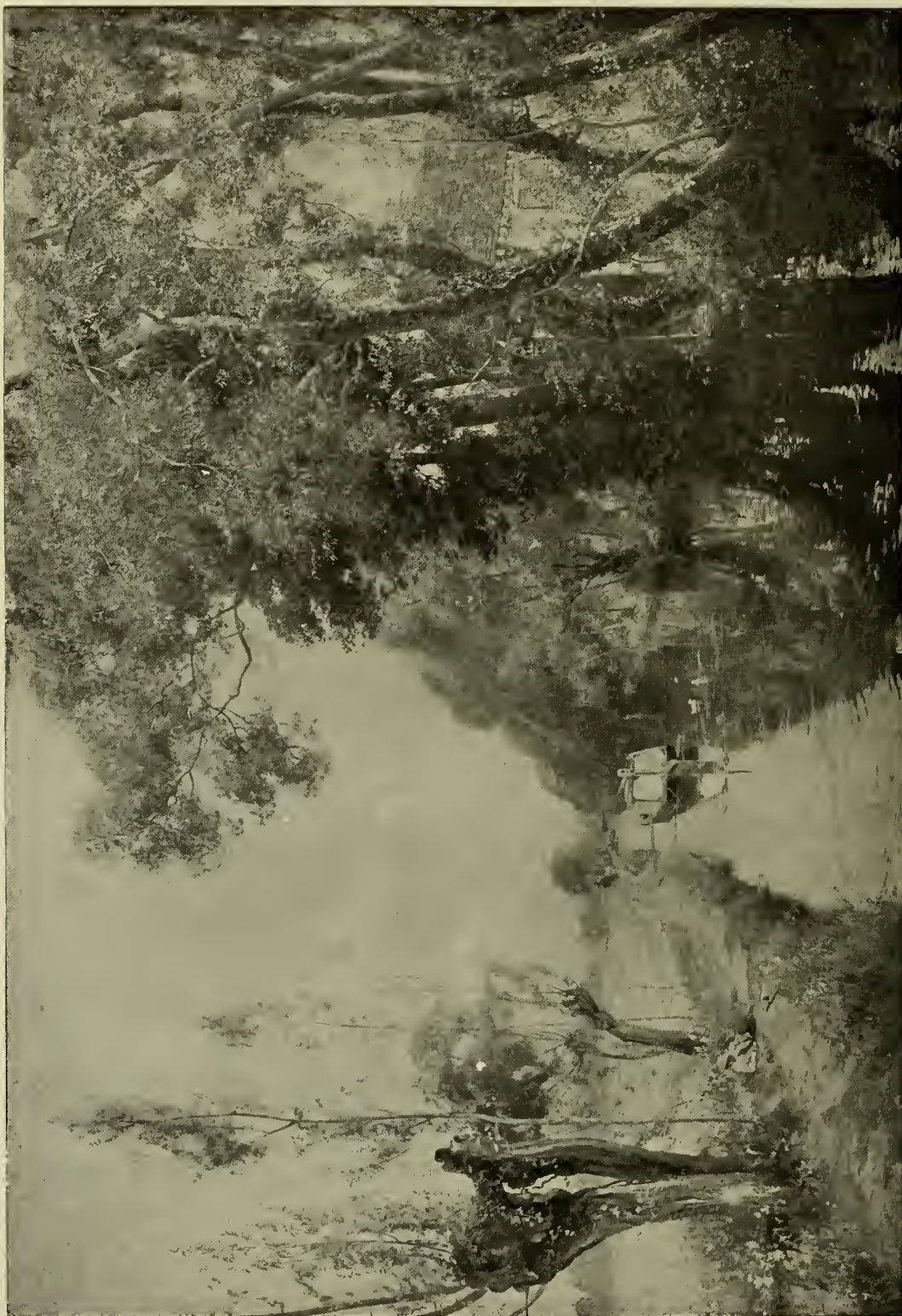
Early in September the fruit is a bright green, quite smooth but not glossy, irregular in outline and bluntly oval. Early in October, when it is ripe, it turns brown, and splits open, showing the nut within, with its hard uneven light-brown shell containing a puckered white kernel.

THE WALNUT (*Juglans Regia*).

The Walnut appears to have been introduced into Great Britain in the fifteenth or sixteenth century. It grows rapidly, and reaches a height of about sixty feet, while the bole may be six or seven feet in diameter. It prefers a rich soil, or one that is dry and chalky, and is subject to injury from severe frosts.

The nuts, whether gathered ripe or unripe for pickling, are valuable. The wood is well adapted and much used for furniture and for gun-stocks : it is light, tough, and durable, the graining is very beautiful, and there is much variety in its rich brown colouring. The grain is coarse, but it will take a high polish. The wood of young trees is light in colour. The leaves, fruit, and bark, when handled, leave a dark stain difficult to remove.

THE WILLOW.



THE KENNET AND AVON CANAL AT ALDERMASTON.

(Ex: Royal Soc. British Artists, 1904.)



THE DAY'S WORK DONE.

WILLOWS.

GENERAL REMARKS.



HAT are the lands the Willows love?
Not the country of parks and stately timbered trees,
where the deer find a soft footing on the stretches of
turf. Not the place of sombre forests and of wide-
spread branches, which meet to shut out the sunlight from the
tangled undergrowth and the tall green bracken.

Here are no bright lights and deep shadows alternating on the slopes of the glade ; here, the running becks make no fairy music round moss-grown boulders, nor is the scented silence of the pine-woods here.

In the bracing winter airs of the hill-country, the wood-cutters are at work. There is the clash of falling trees, the ring of axes, the men shout and sweat, the horses snort and strain ; the chains clank, the huge logs are dragged to the cranes ; galloping hoofs strike rhythmically upon the frosted ground as the team rushes the wagon up the hill.

Thin streams of blue vapour wind among the trees from the fire where the men temper their axes ; it now crackles and now sends up sparks in showers ; it now leaps with a roar into tongues of flame, now cowers under sullen clouds of smoke, as the brushwood is heaped upon it.

These are not the lands the Willow loves, and the mind gives to its image no such surroundings of life and movement. The Willow marks the course of some sluggish stream through lush meadows and flat pastures, and makes a mirror of the deep scarcely moving waters. Drowsy cattle stand up to their middle in the river, leisurely chewing the cud, or shelter under the Willows in ranks, head to tail, the swishing tails doing neighbourly service in keeping off the flies.

The swallows bend and dart above the water, and dragon-flies skim the surface, where rotating eddies appear and disappear ; a reed-punt floating past hardly disturbs the floating leaf-discs of the water-lilies.

This is the country of dreams, of peace and quietude ; the dreams of the solitary, the peace of lowly places, the quietude that goes with humility. With these, rather than with sad or despairing

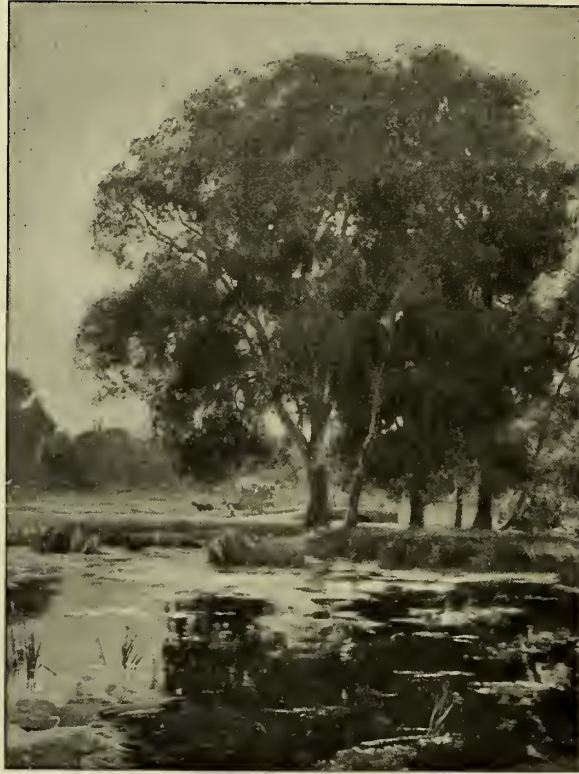
thoughts, it should be the pleasure of the poet to associate the Willows.

NOTE.

Botanists enumerate some thirty distinct species of Willow, each with its train of varieties. Four Willows only, the Bay-leaved Willow (*Salix Pentandra*), the Sallow or Goat Willow (*Salix Caprea*), the Osier (*Salix viminalis* and *purpurea*), and the Common Willow (*Salix fragilis*, *Salix alba*, and *Salix Russelliana*), are here taken in detail as types.



BY A SILENT STREAM.
(COPYRIGHT, FRANZ HANFSTENGL.)



THE COMMON WILLOW.

GENERAL REMARKS.



HE outlines of the foliage on the Common Willow are curiously undefined: the leaves seem to make a soft haze or atmosphere of green about the decorative patterns of the pliant boughs, an atmosphere that merges into the blue of the summer sky. Only here and there, where they are somewhat heavily massed together, does their unobtrusive colouring hold its own.

RAMIFICATION.

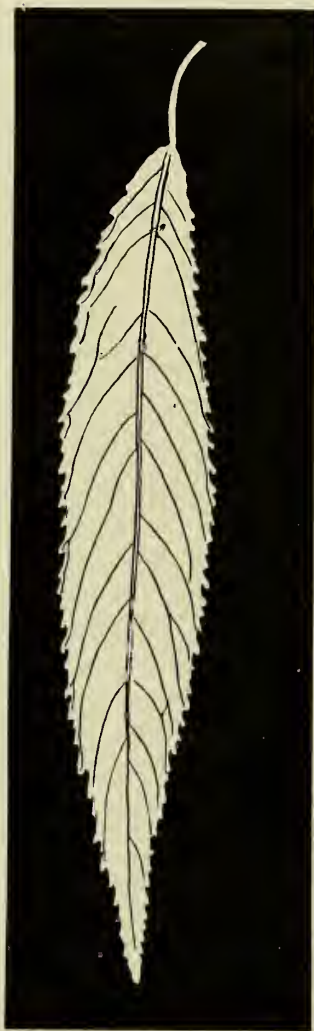
Willow branches ramify quickly into a large number of long, pliant twigs, curved and slender. The true terminal bud is abortive, nor, as in the case of the Ash, does the twig produced from the next bud take the place of the terminal shoot. Instead of this, it leads off abruptly from it. The bud next below on the stem also often fails, or the twig it produces may be lost, for the branches of the Willow are unusually brittle at the points of junction. The general result of these various processes is a series of curves, first in one direction, then in another, varied by sharp turns almost at right angles. When the twigs which tend in one direction are continuously developed, while those tending in the opposite direction are successively lost, or but partially developed, the long decorative curves which often characterise the tree are produced.

In young trees the angle between branch and stem is much more acute than in older trees, and the shoot produced from the bud next below the apex, unlike those already described, does take the place of a terminal shoot. The explanation of this apparent anomaly is very simple. The sunlight falls directly on to the shoot unimpeded by any intertwining boughs, and it is consequently forced upwards. When the shoot has taken its course, the resulting stem bears the mark in one of those kinks that prevent stiffness in the line. The long slender lines of the young tree are sometimes solely due to its rapid growth, sometimes to the use of artifice when it is first planted. Willow poles of considerable length are set like flower-slips; all side branches are removed, and their place is soon filled by numerous adventitious shoots, which spring to light all over the young stems. The branchlets and shoots are smooth, and the latter, in some varieties, polished. The bark on the larger boughs and

trunk is thick and somewhat deeply furrowed, with an irregular vertical diamond pattern.

THE LEAF.

The buds are narrow, long, and pointed; they lie closely to the twig, and are partially curved around it. The young leaves are upright, rolled together, and of a pale glossy green. The mature leaf lies horizontally, or hangs from the twig. Only the terminal leaves follow the direction of the twig. These positions are often modified by the petioles bending across the twig. The leaves are borne singly, but their arrangement differs considerably in the different species.



petioles are short.

The following variations in the leaves of the different species may be noted:—



TWIGS OF WILLOW.
(Notice the curves of the leaf-stalks.)



BRANCH OF WILLOW.



CATKINS.
(Drawing reduced by one-third.)

The Crack Willow has smooth leaves with pale undersides, which are downy in the early stages. The leaf of the White or Huntingdon Willow is covered with silky white hairs on the underside, sometimes also on the upper surface. One variety has a pale green underside. The leaf of the Bedford Willow is smooth on both sides, and tapers at both ends. The young leaves are downy and slender in form. All of these species agree in having the edges of the leaf-blade serrated, and in bearing stipules.

THE CATKIN.

The Willows, like the Poplars, are individually male or female trees. Their habit should be contrasted in this respect with that of the species which bear both male and female flowers, but on the same tree, such as the Alder, the Birch, the Sweet Chestnut, the Beech ; or again with others like the Lime, the Horse-chestnut, or the Maple, where male and female organs are combined in the same flower. The Catkins of the Crack Willow are produced at the apex of the short, lateral, green shoots bearing small leaves. In the case of the White Willow, the shoots are so short as to appear merely a continuation of the central axis of the Catkin. The male Catkins consist of a number of florets loosely arranged on a curved central support. Each of the florets contains two, or sometimes three, stamens tipped with yellow pollen, which stand out from a small sheath. The Catkin measures two to two and a half inches in length, and rather more than a quarter of an inch in diameter. It is cylindrical in shape, with tapering ends. The fertile Catkins resemble the males in general outline, and in the manner in which they are connected with the twig. The central axis supports a number of green seed-vessels, small and pointed, each one attached

to it separately. The ovary is surmounted by a short style which divides into two stigmas in the form of a V; these become brown as the seed ripens, and then gradually curl up and fall further apart to disclose a tuft of silvery down in which it is enveloped. About the middle of May the ground beneath the trees is strewn with fallen catkins and stipules, and with many of the leafy shoots on which they hung.

THE COMMON WILLOW (*Salix fragilis*, *Salix alba*, *Salix Russelliana*).

The Crack Willow (*Salix fragilis*) reaches eighty feet in height, the White Willow (*Salix alba*) and the Bedford Willow (*Salix Russelliana*) fifty or sixty feet : all these willows are of rapid growth. They appear to be natives of Britain.

The Bedford Willow is a cross between *Salix alba* and *Salix fragilis*. These varieties will not grow on as high land as the Goat Willow, though in damp neighbourhoods they may occasionally be found at a fairly high level. They will also grow by tidal rivers, even though subjected to floods of brackish water, but will not thrive in the shade of other trees. They are generally grown from cuttings, and their unfailing power of reproduction in this way makes them valuable in preserving the margins of rivers, since a few slips soon form roots and numerous branchlets which bind the banks together, and enable them to withstand the friction of the water. But it is as pollards and for their long poles that these trees are chiefly useful. Although they are occasionally grown in osier beds, the withies they produce are less suitable than the osiers for basket-work. These three species, with the Goat Willow, are the only ones sufficiently large to bear timber. They are liable to injury from a host of insects.

POLLARDS
IN WINTER.

POLLARD WILLOWS.

The Pollard Willow has not the same fine branch pattern as the tree in its natural shape, but it sends out long shoots from the stump in curves that are pleasant to the eye, and answers to the breeze with a shimmer of white that plays over the up-turned foliage. Nor are the old stools wanting in picturesque qualities. Even when they are split and heeling over, they hold to the last to their posts as time-worn guardians of the stream's course; their splintered wood shows pink in the sunlight, and festooning brambles and wild roses root themselves in the fissures of the rotten stems. When freshly coppiced the old Pollards stand firmly out of the flood water—dark forms against a winter sky, gaunt and forlorn.



POLLARDS.





THE OSIER.



HOW many picturesque scenes of country life centre round the growing of the Osiers! There is the coppicing of the "rod" beds in spring or autumn, the loading of the punts on the still stream, the stacking in the yards. Best of all is the peeling of the withies which takes place in the summer time. The yard by the river-side is filled with withy bundles; the longer rods are stacked and carefully thatched, others are set up in rows with their butt ends in trenches full of water. These last are gemmed all over with fresh young leaves—so persistent is the sap of life in the arteries—even though they may have been first put out into the trenches the previous autumn, while the water holds the reflection of their red stems. In the foreground of the picture are the women and children hard at work at the peeling.

Beside each group is a forked stick, made like a wooden clothes-peg, and called a "break," and through and through the fork the withy stems are pulled till the red bark is stripped, and they glisten ivory white in the sunshine.

Meanwhile the men-folk are busy sorting the peeled withies and laying them in rows on a framework of rods to dry.

There are several species of Osiers, and as they frequently cross, still more numerous varieties. The name "Osier" is frequently given to any of the smaller Willows which are suitable for basket-work, that is to say, those which produce tough, flexible shoots.





MALE CATKIN.

The leaves of the different varieties are distinct in form and texture. In some cases they are long and covered with silky white hairs, in others quite smooth and of a bluish-green colour. One species is remarkable for its purple anthers. The shoots range from yellowish-brown to purple-red, and the colour is affected both by differences of soil and by the changing seasons.



THE WATER-WAY TO
THE WITHIE BEDS.



SKETCH OF A
WILLOW TREE.

It is worthy of notice that the leaves of the withies in the Osier beds are commonly rather more defined than those on the twigs of a Willow tree. This may be accounted for by withies being more rigid and retaining a vertical position, while on the other hand the slender twigs of the tree often lie horizontally. For the same reason, and from their height and the want of "cover," the withies are more liable to be swayed by the wind.

THE GOAT WILLOW.




— WHEN THE
SALLOW FLOWERS.

THE GOAT WILLOW

(OR SALLOW).

GENERAL REMARKS.

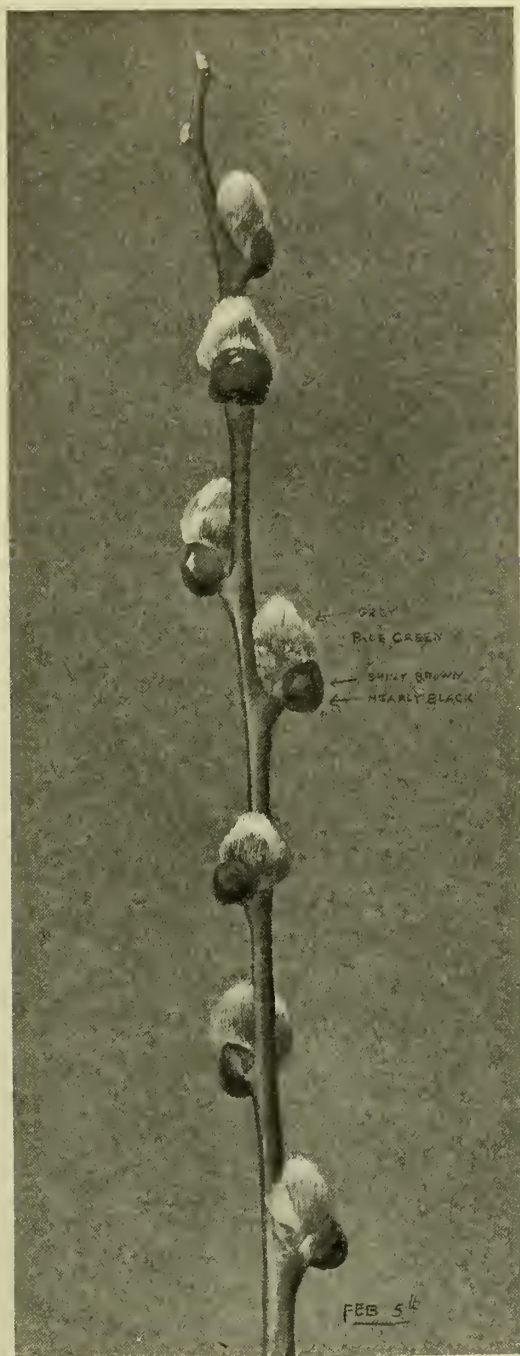
HE buds which contain the promise of seasons to come are in all cases carefully protected against the severity of the winter weather, whether by leaf-stalks, or stipules, or by the withered leaves of the past season. There is great diversity in the form, texture, and arrangement of the bud-scales themselves. On some trees they are woolly, on others gummy or resinous. In some species they are numerous and arranged in spirals, as in the Scotch Fir; in others they are found in rows, few or many, overlapping one another, like roof-tiles reversed, from the tip to the base. The bud of the Beech has four such rows, the Elm two, the White Beam five. The casing of the Willow-bud consists of a single scale, and this, in the winter, makes a point of distinction between certain of the Willows and the Poplar tribe, which are closely allied. The bud-scales of the Poplar are numerous, usually coated with gum and arranged in a spiral. Poplars, moreover, usually have true terminal buds, while the growth of a Willow is continued from a lateral bud. The bud-covering of the Goat Willow consists of a single cap, with a projecting rib on either side, marking it off into two sections. In spring time the cap splits from the tip downwards along the centre of each section.

The Goat Willow is a small tree or shrub. It is useful in the hedgerow, as it bears cutting well, and will often produce shoots to the length of eight or ten feet in a year. Like those of other Willows, its branches easily root themselves, and in the autumn are often cut and planted to bind the banks of streams.

The Goat Willow is distinguished from most of its species by its round unpolished many-veined leaves. Its catkins, like buds of silver-down—later on to be fringed with yellow pollen—are among the earliest tokens of spring. When its seed-vessels burst, towards the end of summer, they scatter a soft down in masses over the twigs.



TWIG OF GOAT WILLOW
IN FEBRUARY.



YOUNG MALE CATKINS
WITH THE BUD-SCALE
STILL ATTACHED.

(Drawing reduced by one-third.)

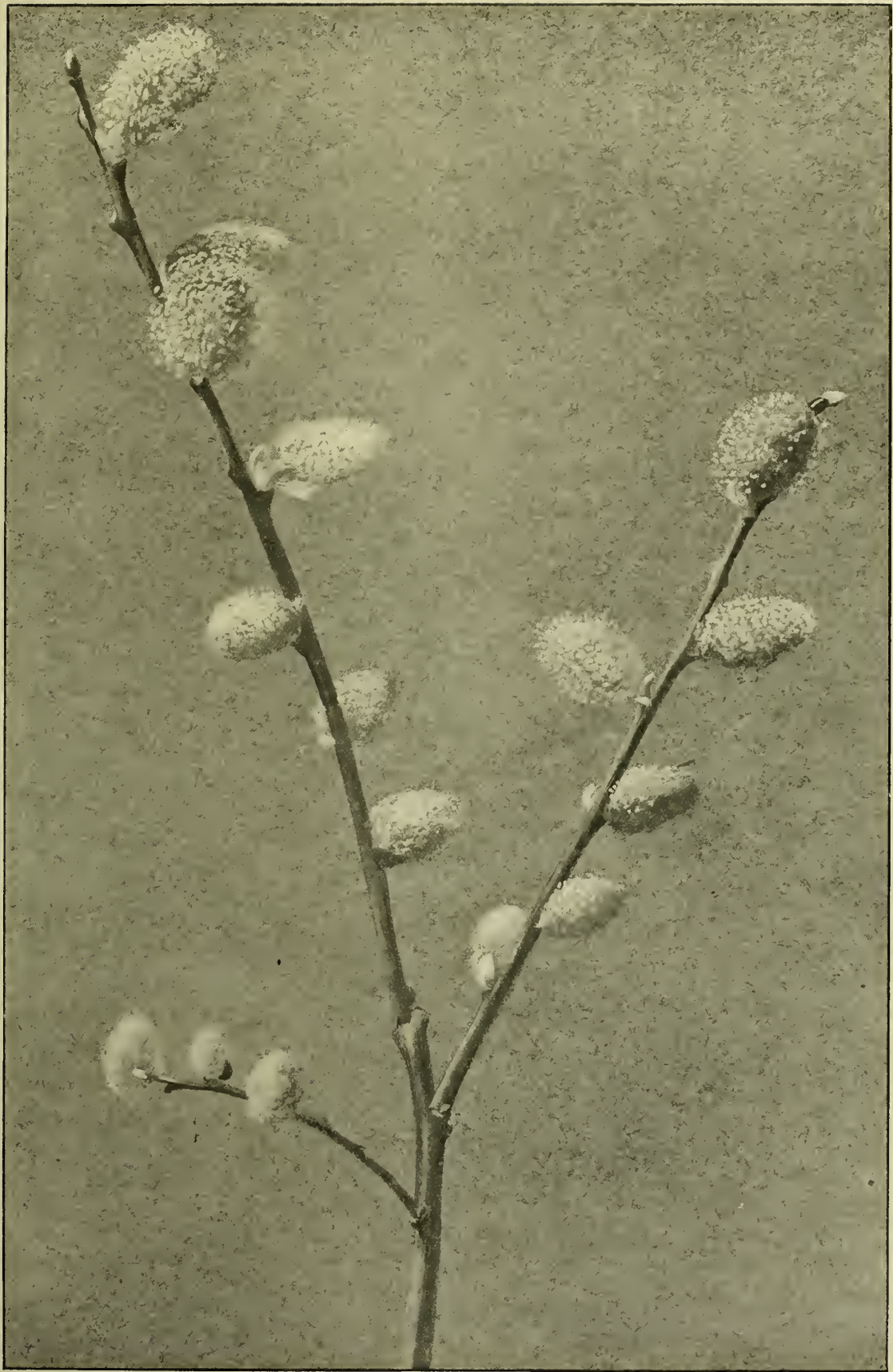
THE CATKIN.

The male and female Catkin of the Willow group grow on separate trees. The male Catkins are enclosed in a brittle brown case, and arranged alternately along the twig. About the beginning of February, while the leaves are still in bud, they burst their prison and appear as erect silver-grey silky cones, about three-quarters of an inch long.

To the base of each the crisp bud-scale, retaining its cup-shape, still clings. When this falls, the six or eight pointed, spreading stipules at the base of the Catkin become visible. They are a delicate greenish-yellow on the inner-side, that which in the bud was next the Catkin; the outer side is covered with silver hairs.

The Catkins gradually acquire an oval shape; a length of about an inch and a quarter, and a diameter of half to three-quarters of an inch. They consist of a central green axis, standing out from the twig, thickly covered with minute hairy segments. Each segment or "flower" contains from two to five stamens, and a honey gland. Every stamen has a two-lobed pollen sack supported on a long filament. The colour of the pollen, at first a sulphur yellow, changes to a golden hue, and the hum of countless insects is heard round the flowers.

The female or fertile Catkins will be found about April covered with soft down. In place of the stamens of the male flower is found a silky green ovary, surmounted by a style tipped with a pair of stigmas. As the Catkin becomes ripe, the stigmas curl backwards and downwards in opposite directions, forming as it were two croziers on either side of a triangular upright tuft of silvery down. About the end of April this tuft expands, enveloping the twigs in down, and the tiny seeds it contains are wafted away by the wind.



MALE CATKINS.



FEMALE CATKINS.



This drawing of a female catkin of one of the smaller Willows shows clearly the construction of the ovary, with its slender-pointed style ending in two stigmas. The small diagram of the separate flower shows how the stigmas curl back on either side of the tuft of down and the style splits.

THE LEAVES AND BRANCHES.

In autumn the shoots formed during the year are a bright green colour, with tinges of purple and grey on the exposed side. The older branches are a glossy dark green or purplish-brown. The buds are arranged singly, but close together, near the top of the shoot, and are conspicuous for their pale yellow-green colouring and their red tips. They are found springing from five different points along

the stem, the first bud being placed in a direct line over the fifth bud. So close together are the buds on the upper part of the shoot that the tip of one reaches to the base of the other. The lower part of the twig is bare, and in like manner the lower parts of the branches are destitute of twigs, though marked by numerous projections at the points where flowers were produced in former seasons.

In the early spring the bud-scale is a bright yellow-brown colour: as the bud expands it splits from the tip downwards, forming a U-shaped shell at the base of the young leaves. These are curled up from the side to the centre, and rolled round one another, so that they form a cone of bright silvery green. As the leaves expand their tips curve backwards, and the bright green of the shining upper surface is exposed. The under-side and the young stem are still covered with whitish down. By August the upper surface of the leaf-blade has grown darker in colour, and become indented with a net-work of veins: it has no gloss, and when seen foreshortened, appears slightly downy: the under-side is a paler green, with blue tints and veins inclining to yellow. The leaves are opaque and somewhat thick, and the veins, though numerous and strongly marked, do not crinkle the blade between them. As regards their position on the shoot, they are either horizontal or inclined slightly upwards. The shoot soon loses the down that distinguished it in the early stages of growth, and becomes mealy and purplish-green in colour. In summer the stout pointed buds, set between large fan-shaped stipules in the axils of the leaf-petioles, are very noticeable.



This drawing shows the fan-shaped tuft of down further developed, and how it covers the whole catkin before its final dispersal by the wind.



BOUGH OF GOAT WILLOW.



BAY-LEAVED WILLOW.

GENERAL REMARKS.—(Willow Leaves.)



T would seem as if Nature in her dislike of repetition had exploited every variation upon a preconceived model in the making of Willow leaves; each species being distinguished from its fellow by some slight yet skilful modification of the original type, to which all might be referred. But with the Bay-leaved Willow she has so far exhausted her ingenuity in the one direction as to make use of another model.

She has given a glossy surface to the leaf, which responds to the sunlight with a bright reflection, as readily as its fellows of the Willow tribe, which are slender and silken grey, do to the motions of the breeze. She has made it oval, instead of shaping it like a lance, and has endowed it with a pleasant scent.

The Bay-leaved Willow might be mistaken for a cultivated Evergreen, on account of its leaf, did not bark, twigs, buds, and catkins identify it beyond doubt as belonging to the Willow tribe. In some northern countries it is a common bush; less often it reaches the dimensions of a tree of some twenty to thirty feet in height.

The flowers appear about two months later than those of the Goat Willow, and bear but little resemblance to the blossoms of the Willow family in general.

LEAVES AND BRANCHES.

Late in the Autumn the new buds and shoots formed during the growing season are conspicuous for their yellow or purple-brown colour, and have the appearance of being varnished rather than polished. Those of the previous year are also glossy and of a pale yellowish-brown, while the older wood has a tinge of green. The pliant young branches form a series of angles something like Y's with curved tails, and carry on the arms of the Y a number of buds arranged singly, and at its base other tiny hard buds. Early in May the buds expand, and the stipules of shining bright green which they contain, lengthen, and might be mistaken for leaves, so nearly do they resemble them. The young upright leaves themselves are of a bright glossy pale green, and are rolled round the still undeveloped inner leaves, which they completely enfold.



FOLIAGE AND FEMALE CATKIN
OF BAY-LEAVED WILLOW.



BOUGH OF BAY-LEAVED WILLOW.

Up to this point the buds have had an oval shape with pointed tip and base, but now the outermost leaves begin to turn backwards and form a rosette round the inner ones which remain upright in the shape of a cup. The leaves at this stage are soft, but the thickness of the blade makes them practically opaque. The mature leaf has a prominent mid-rib: its upper surface is a deep glossy green; its under-side a paler shade, and it turns to yellow before it falls. The central rib is noticeable as a projection on the upper and under-side of the leaf.

CATKINS.

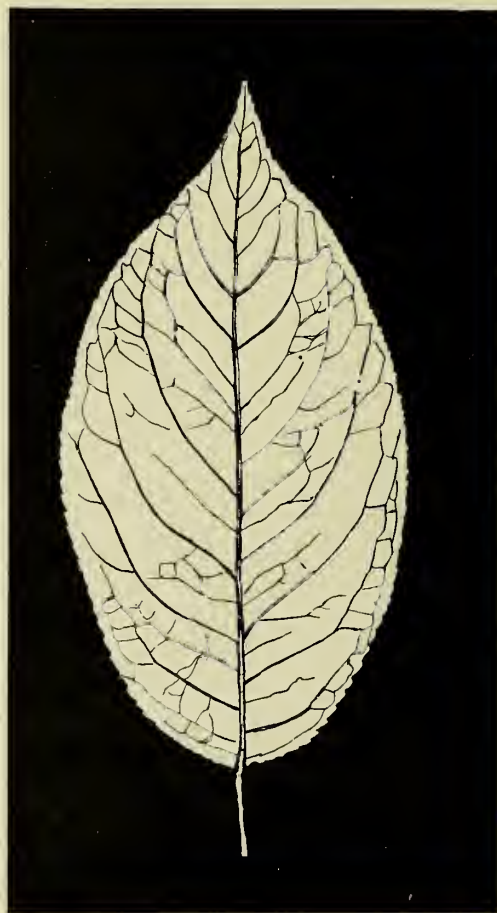
Towards the end of May the soft yellow Catkins, which are pointed and shaped like a cylinder, stand up in the centre of a goblet of fresh green leaves, at the base of which a pale green foot-stalk is visible between the falling scales. The developed flower still keeps an upward direction, and consists of a long axis, from all sides of which spring at intervals groups of long yellow stamens (often five in a group) tipped with pollen sacks of a redder colour. The growth of the stamens in bundles helps to distinguish the flowers from those of other Willows where they appear to be scattered separately.

The female Catkin is not fully developed till June. The Catkin occupies the upper part of a single pale green stem nearly five inches in length, and furnished with small leaves; its length is about three inches.

The green florets are set on short foot-stalks, and point in different directions; they are shaped like a flagon, from the neck of which (the style) protrude the dark stigmas in the form of a Y with curved wings.

BAY-LEAVED WILLOW (*Salix Pentandra*).

This Willow is also grown with the true Osiers, and is said to give a useful product (*Salix Cuspidata*) when crossed with the Crack Willow, one of the true Osiers. In parts of Yorkshire it is used for forming hedges, the branches when notched and pegged down soon forming a strong substitute for rails, and the twigs, when set, quickly taking root from the uprights. When used for this purpose, the Bay-leaved Willow is often found at a fair altitude, more especially where the ditch which it banks is fed by running streams from the hills.



PLAN OF LEAF
(BAY-LEAVED WILLOW).

THE CHERRY.



CULTIVATED CHERRY.

THE CHERRY.

GENERAL REMARKS.



WHEN a golden line of King-cups marks the winding of the streamlet through the withy-bed, and the tender green of the coppice scarcely conceals a carpet of anemones on the ground, the white blossom on the wild fruit trees holds a foremost place in the harmony of Spring colours in the woods. The Wild Plum, the Pear, the Crab Apple, the Bird Cherry and the Wild Cherry, all contribute their share. The Cherry has brighter tones to blend with the rest. The whole tree is full of suggestions of colour. Brilliant patches of orange and crimson show where the sun is shining through the thin leaf-blades, while, even before they unfold, the leaves give back a glitter from their glossy under-sides. The branches hold tints of pewter-gray, of purple and of brown, the stipules of brown and orange, while the leaves have rose-red stalks and the flower-buds are pink. When the bluebell and the orchis replace the anemone these buds expand, and clusters of white blossom and bright leaves hang on every twig.

Loveliest of trees, the cherry now
Is hung with bloom along the bough,
And stands about the woodland ride
Wearing white for Eastertide.

HAUSMAN.

CHERRY TREES.



THREE species of Cherry are common, *Prunus Avium* (the Gean), *Prunus Cerasus* (Common or Wild Cherry), and *Prunus Padus* (the Bird Cherry).

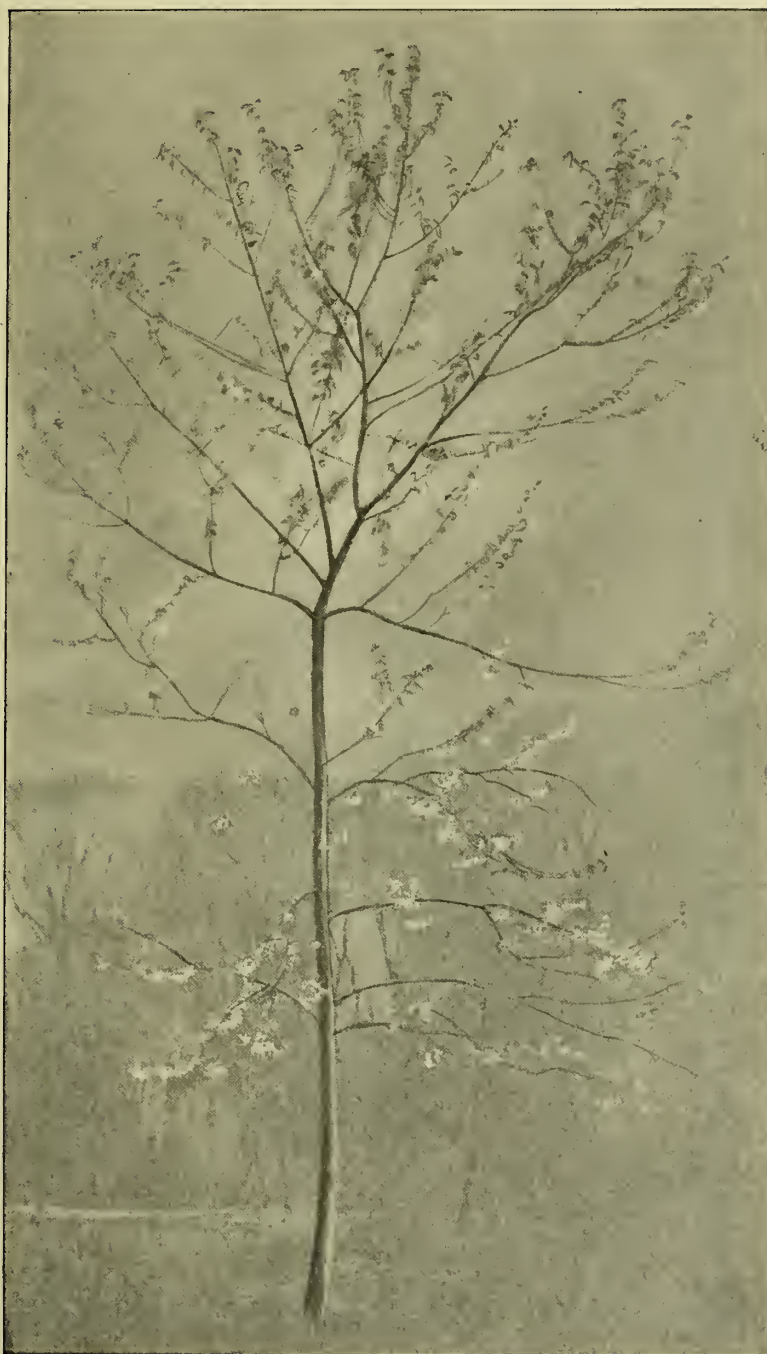
Most of the cultivated varieties appear to have been developed from *P. Avium* and *P. Cerasus*. These two differ from one another in certain details.

P. Avium, a tree of some thirty feet in height, bears flowers that open out widely, and fruits somewhat oval in form, with the fissure clearly marked. *P. Cerasus* is of slighter build; the flowers retain the typical vase-form one associates with the blossom of the Cherry, and the fruit is rounder. Other minor distinctions exist between the cultivated varieties, but these are not of sufficient importance to require separate description for the purposes of this book.

The Bird-Cherry (*Prunus Padus*) is totally distinct from the foregoing. Its branch-system is free from the stiff habit of the Cherries already named. The flowers are in racemes—a number of small wide-spread florets attached to a main flower-stalk by short pedicels—and afford a great contrast to their long-stalked cup-flowers, which hang in clusters. Its fruit is smaller, and bears no resemblance to theirs either in its pointed oval form or in its arrangement on the central axis and its often upright position. The Bird-Cherry is described separately in detail.

RAMIFICATION.

The variety in length of the upper and the lower branches on trees of different species produces an equally great variety in their



THE YOUNG CHERRY TREE (Gean).

outlines against the sky, which may be semi-circular, ovoid, pyramidal, and so forth.

But almost all full-grown trees have this feature in common ; their outlines may be contained in a boundary built up of straight lines, for the denseness of twigs and foliage preserves them unbroken. The Beech-tree, which has its branches arranged as if in a succession of spires, is an exception to this rule, and the Cherry-tree is also conspicuous for the gaps or hiatuses, like jagged incisions between the boughs, which break into its outline. This appearance is due to its long straggling and sparse branches being ill-supplied with side-twigs to fill up the intervening spaces, while the twigs that do exist are short in proportion to the length of the branch which supports them.

The main boughs usually spring from the stem at half a right angle, but in the process of growth this is often modified into a gradual curve : some of the boughs form from the first no more than a right angle. These slight variations lead to a lack of graceful proportion in the ramification of the tree.

The branches are usually pendent, with the ends curved upwards, but here again vertical shoots, which spring from the upper side, often break the continuity of the curve. The newly-formed branches are a dull pale brown in colour, those of older growth are darker and glossy, smooth and round, with gray and purple tints mingling in the brown. The yellow perforations which mark the young wood become at a later stage grooves encircling stem and branches. The colour of the buds is a rich brown. A mature Cherry-tree reaches a height of from twenty to thirty feet.



FLOWERS AND FRUIT.

The buds which contain the inflorescence are usually found clustered round the leaf-bud on a short twig; on first opening they display the stipules, which are conspicuous for their bright green and pink colouring, and which are surrounded by orange-brown scales. In the centre of the cluster of opening buds are other small stipules with rudimentary leaf-blades. About the middle of April several flower-buds, each supported by a single stalk, begin to push their way out beyond the stipules and scales of the parent-bud. Their stems soon lengthen and curve upward: they are of a pale shining green, and about one and a half inches long. The sepals turn reddish-brown and separate one from another, disclosing the rosy pink of the petals folded between them. As



the petals open out, the sepals turn back and lie flat against the calyx-tube. At the next stage the stalk bends downwards, and the petals, hitherto cup-shaped, spread out until they lie in one plane. The form is shown in the diagram.

The petals are pure white or tinted with the palest rose-pink, the pistil is green, the stamens are white tipped with yellow.

The fruit when ripe is red or black (*Cerasus* has red fruit), and smaller than in the cultivated species, but, like it, smooth and shining, slightly cloven and flattened into something of a heart shape.

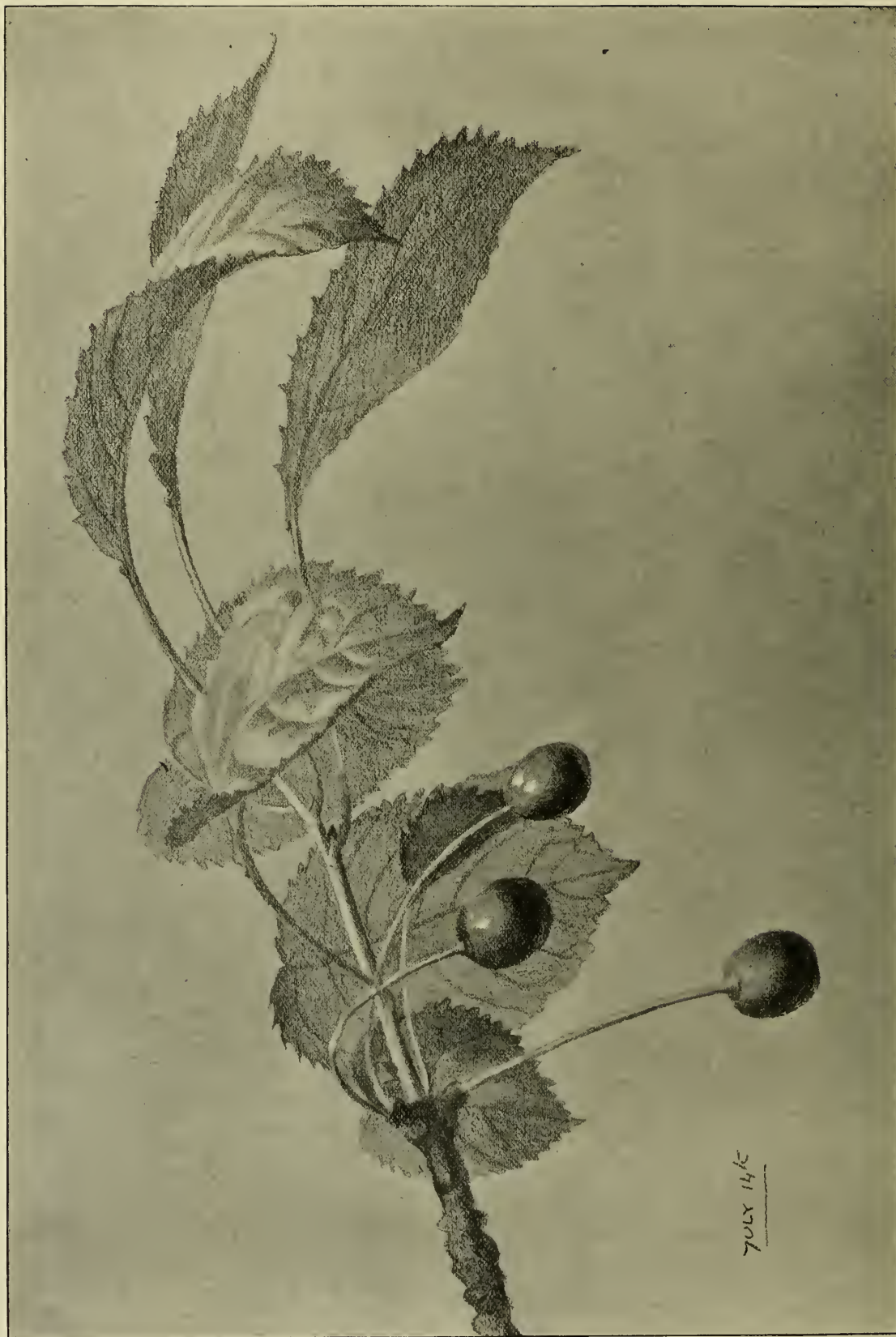


THE LEAF.

In the early part of April there is still nothing to be seen of the young leaf but its glossy underside. The two halves of the leaf-blade are closely folded together from the central spine, and it stands upright. In this position, with the straight line of the mid-rib as one of its boundaries, and the full curve of the blade as the other, and with its tapering point, the leaf is no less conspicuous for its shape than for a highly reflective surface. This glossy surface is made still more effective by the arrangement of the leaf-veins, which project and prevent the blade from lying evenly in the



BRANCH OF CHERRY
(Cultivated).



FRUIT OF WILD CHERRY.

same plane. The colour of the nerves varies from purple to rose-red and green. As the leaves grow, they droop or take a horizontal position, but even when as much as an inch and a half long they still remain partly closed.

Several of the rose-red leaf-petioles radiate from the same point, and are surrounded at the base by bud-scales and rudimentary leaf-



PLAN OF LEAF OF CULTIVATED CHERRY.

(WILD CHERRY LEAF IS RATHER SMALLER.)

blades. By the end of May the new pale green shoot carries leaves of two or three inches long. Their upper side is now a dull bluish-green and somewhat dark; the under-side has become paler and lost its gloss; both surfaces are smooth. The petioles have acquired the tinge of crimson on the upper-side, which they retain throughout the summer, and carry honey-glands near the base of the leaf. The leaves are arranged singly round the new shoot in sets of five, the sixth leaf beginning a fresh spiral at a point directly beneath that at which the last spiral began. On the older shoots the leaves grow in clusters, their stalks radiating from a single point at the extremity of a very short twig marked with many rings. As the season advances, they become less tapering; the bud-scales fall away, and the flower develops into fruit. The full-grown leaf often measures as much as three or four inches. The autumn tints are bright red and orange.

THE CHERRY (*Prunus Cerasus*, *Prunus Avium*).

Authorities state that the cultivated Cherry was introduced into Britain about A.D. 50, and that improved varieties were extensively planted in the time of Henry VIII. The Gean (*P. Avium*) appears to be a native. *P. Cerasus* also is considered by some authorities to be indigenous. The wood is sweet scented, of a rich red colour, and fine grain, and well withstands variations of the atmosphere.



BRANCH OF WILD CHERRY.



THE BIRD CHERRY.

GENERAL REMARKS.



HOW faint and intimate are the first tokens of Spring's approach! Long before her green banners are hung out in triumph it has ceased to be true that "there is no sign of Spring." And yet the signal may be no more than that the buds have stirred. All through the winter, since the last leaves of autumn fell away, they have lain close to the protecting twig, but now they spread away from it, in the first motion of growth that comes with rising sap: or having rested across it, between the bare earth and the grey sky, they now turn upward to the light of the spring sunshine.

Look now, one by one, at some of the surrounding trees. The Beech shows flat horizontal layers of buds and twigs, while the young leaves already half open droop as do those of the Hazel. The Maple and Horse Chestnut buds alike are stark upright, and from them the leaf-pairs will presently emerge. The Mountain Ash buds and those on the Willow, and still more noticeably on the Bird Cherry, curve curiously round the twig.

The Bird Cherry, though a small tree, rarely exceeding twenty feet in height, is attractive in many ways. Those curved and tapering buds, of which we have spoken, often unfold their hidden wealth of brilliant green leaves and graceful flower-racemes before the primrose time is over. In May there is a display of pure white blossoms growing in oval clusters, and the leaves reach their full development and are large and finely veined.

The twigs are slender and delicate, and the branches, both great and small, are smooth and rounded, and so well graduated in size that a main-branch appears exactly proportioned to the several branchlets into which it divides. The curves of the branches also are very graceful, and the whole gives an impression of delicate workmanship beside which such a tree as the Horse Chestnut seems clumsy and coarsely moulded.



OPENING LEAF BUDS.



THE FLOWER AND LEAF BUDS
IN TWO STAGES OF DEVELOPMENT.



BIRD CHERRY FLOWER.

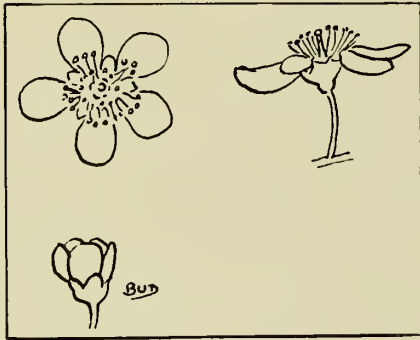


RAMIFICATION.



THE FLOWER.

The main flower axis is produced from the apex of the new shoot formed during the early Spring, and continues the direction of the shoot, though often with a curved line.



The flower cluster consists of a main axis, at first upright, from two to three inches long, which bears at intervals numerous five-petalled white blossoms, attached to it by shorter subsidiary pedicels. The flowers have each a white

stipule at the base. The buds are first seen early in April, and are fully out by May, when the raceme droops with their weight. The petals open out widely, so that spaces are left between them.

The fruit is pointed, and its oval slightly elongated. When unripe it is a rich red colour, when ripe black, and no less popular with the feathered tribes than the garden cherries are with humans.



FRUIT OF BIRD CHERRY
(Natural Size).

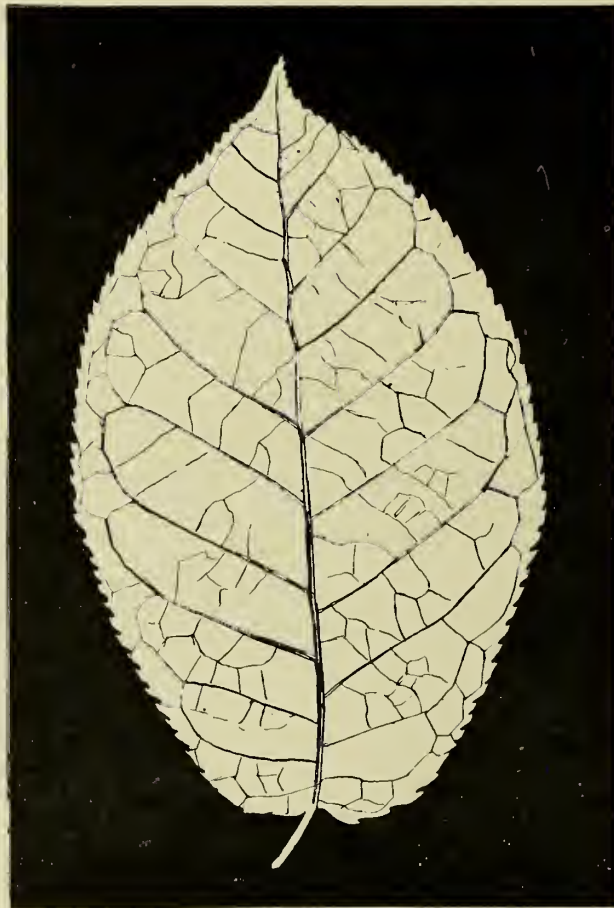
THE LEAF.

The buds are purplish-brown, long and tapering to a point. They are arranged singly in sequences of three.

The young leaves are folded lengthways along the mid-rib, and only the light glossy surface of the under-side is to be seen. The bud-scales do not fall away at once, but continue to grow and to protect the leaf-petiole for a time. When the leaves are fully developed they lie horizontally and nearly flat; the leaf-blade itself, however, is waved and puckered.

The underside soon loses its first glossiness, though it remains a bright green, paler in tone than the upper surface, and beautified by the clear "intaglio" pattern which the main and secondary

veins weave across it. The leaf-stalk, like the under-blade, is bright green at first, but later in the season becomes tinged with purple, and the leaf itself changes from the dark green of Midsummer to yellow in the Autumn.



PLAN OF
BIRD CHERRY
LEAF.

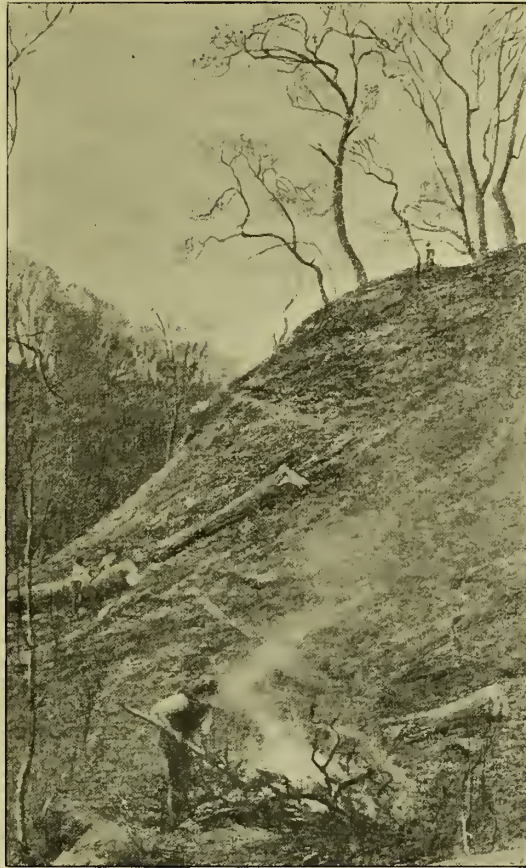
THE BIRD CHERRY (*Prunus Padus*)

Is common by the beck-sides and in the woods of the Wharfedale district of Yorkshire and in the north of England generally. Its beauty is sometimes spoilt and the whole tree made unsightly by the cocoons of a species of caterpillar which infests it.

THE ELM.



AN ENGLISH LANDSCAPE.
(Ex: ROYAL ACADEMY, 1904.)



THE ELM.

GENERAL REMARKS.



WHEN March winds sway the Elm branches, the rooks that cling to the tree-tops, with much cawing and the clamour of never-ending disputes, proclaim the approach of Spring. All through the winter the bare branches have shown delicately outlined against the sky, but now the tufts of purple-red flowers which cover the numerous twigs give

them a blurred and thickened look. When April comes, bunches of fruit replace these flowers, and to them even more than to the young leaves now unfolding is due the early greenness, especially of the Wych Elm.

In May, branches as well as trunk are pointed all over with regular dots of bright green, a great contrast to the skeleton lines of the Ash-tree foliage, or the tufts of pink and yellow on the Oak. With July the leafage reaches its perfection. The sunshine streaming on the masses of foliage, leaves green hollows in deep shadow ; on the further side of the tree there are tints of grey (bluer in tone than the greys of the oak foliage, which incline to red), and here and there, where the sunlight passes through detached leaves, brilliant patches of yellow-green. The play of light and shadow in the foliage, and the severity of the outline, built up of straight lines, give an aspect of breadth to the tree, and the small size of the leaf prevents that effect of hardness which distinguishes the foliage of the Sycamore.





ELM TREES.

"FISHING IN WHARFE."

(EX: ST. LOUIS INTERNATIONAL EXHIBITION, 1904.)



"ANOTHER NEW DAY."

(BY PERMISSION OF R. CHIGNELL, ESQ., THE OWNER OF THE PICTURE.)

SPECIES OF ELM.

GENERAL DESCRIPTION.

There are several varieties of the Common Elm, but the only ones with characteristics calling for special remark are the Common Elm (*Ulmus campestris*), and the Scotch Elm (*Ulmus montana*). The chief points in which they differ are enumerated below. In each there is a strong similarity of construction, both in flower and fruit, and in the arrangement of the leaves.

THE TRUNK.

In the English Elm this is massive and covered with rough bark, which is grooved vertically and divided into upright oblong sections by horizontal incisions. The trunk is conspicuous throughout its height, although usually partially hidden by numerous adventitious branchlets.

In the Wych Elm the trunk soon divides into several large limbs, which spread outwards and upwards with full sweeping curves. The branches are smoother, rounder and longer, more unrestrained in their habit of growth, and pendent at the end. The upper boughs usually extend further than the lower ones. Suckers are found only in exceptional cases.

LEAF.

In the English Elm the base of the leaf where it joins the stalk is uneven; on the one side it forms a convex curve, and meets the stalk at a point lower down than on the other side, where it forms a concave curve. The foliage is dense, and remains on the tree till late in the autumn.

In the Wych Elm the base of the leaf where it meets the stalk is nearly regular. The leaf is much larger and coarser than that of the English Elm, and has a tapering point. Between the secondary ribs the leaf blade is fluted rather than crinkled, like that of the other tree. This fluting and the more tapering shape, together with the large pink-tipped stipules which protect it while it is developing from the bud, are all features which make it easily recognisable. The foliage of the Wych Elm is less dense; it turns a brighter yellow and shrivels earlier in the autumn.

FLOWERS AND FRUIT.

The seed-discs of the English Elm are deeply cleft; the seed is nearest the end of the disc away from the stalk. Those of the Wych Elm are much larger, nearly oval, and only slightly cleft; the fruit is nearly in the centre of the disc. The flowers expand later, and are larger and arranged in looser clusters.



'TIS BLYTHE MAY-DAY.

(EX : ROYAL ACADEMY, 1897) *Copyright, Franz Hanfstengl.*



THE ENGLISH ELM

(*Ulmus Campestris*).

RAMIFICATION.



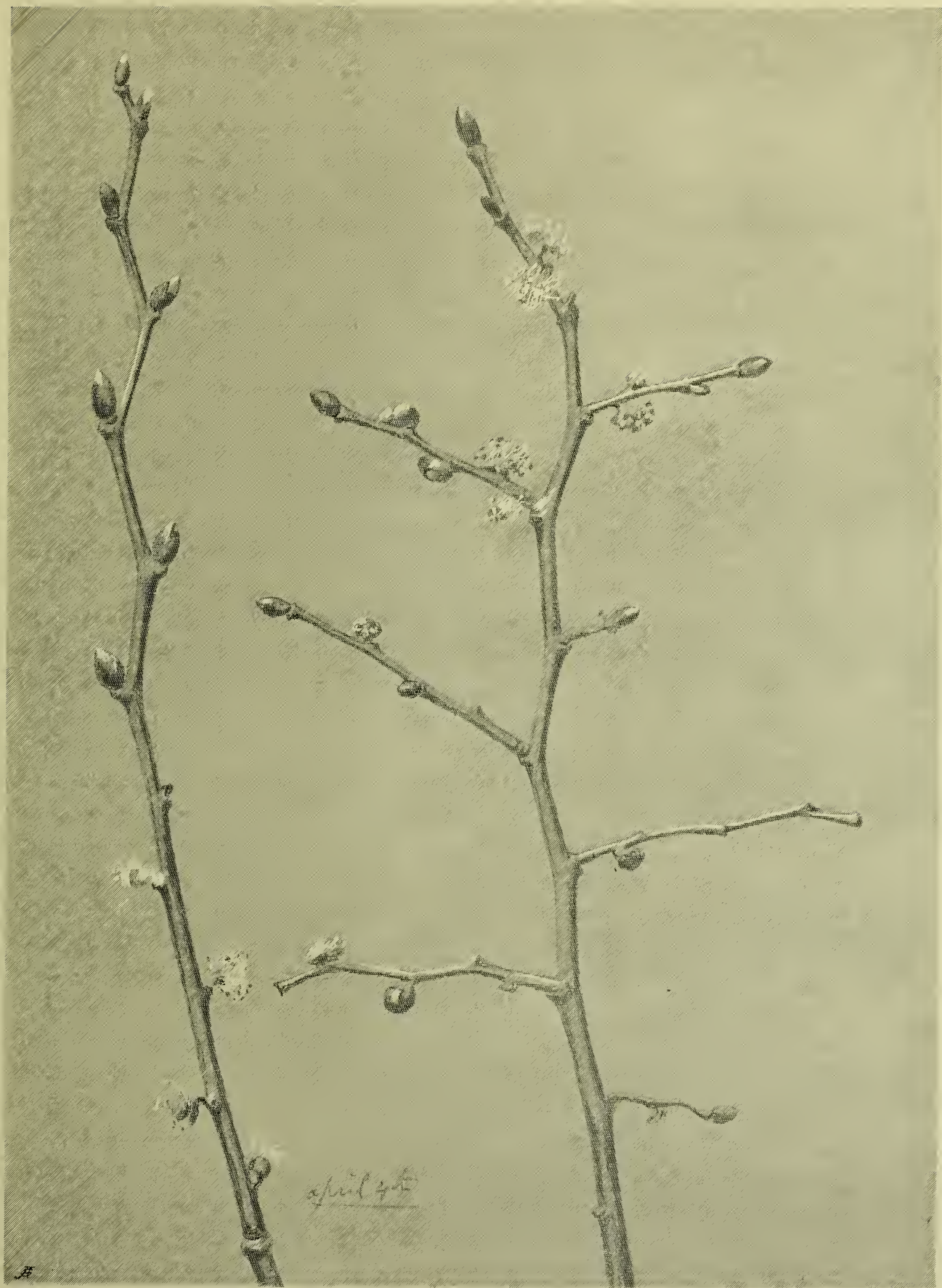
THE twigs are of a dull-brown and hairy, so that, like the leaves, they feel rough to the touch. The twig takes a zig-zag course between one bud and the next, and, as in the Beech, both buds and twig lie in one plane, while the buds are arranged alternately along the twig. The leaf

buds are brown, pointed, and less rounded than those which contain flowers. When the buds unfold, the scales remain attached to the twig at their base, until they are pushed off by the expanding leaves and the stipules which cover them.

The true terminal bud dies away, leaving only a scar, and another bud takes its place. The leaf scars are shaped, roughly speaking, like an ellipse, and are marked by a crescent of three dots where the leaf fibres pass into the twig. The buds are covered by about eight overlapping scales.

The zig-zag line of the twig is accentuated by the buds which mark each projecting point. In the following year, when the buds have produced their shoots, the line of the parent twig is far less noticeable, and, except for its thickness, each portion of it between the lateral shoots might be mistaken for one arm of a fork produced from a pair of terminal buds. Another reason for this competition between the new shoot and the parent twig is that both twig and shoot often diverge equally from the line of the twig below their point of union. The exactness of the Y so formed will be seen by reference to the diagram of the twigs (page 517), more especially if the portion of the drawing above the Y is covered over. The rule which the twigs observe of keeping in one plane is not adhered to by the subsequent branches, as is the case with the Beech and Hazel. The boughs are often stiffly pendent, and curve upwards and downwards; nevertheless the ramification of the twig is helpful in studying the more complex arrangement of the branches.

The new shoots usually curve slightly in a direction away from the apex of the twig, though still in the same plane with it. The twigs as a rule are a dull brown, but they sometimes incline to yellow or red.





THE FLOWER.



THE FRUIT
(WYCH ELM).

FLOWER AND FRUIT.

The rounded buds which contain the flowers have a brittle covering of shining brown. Early in April this covering falls away, allowing the flowers to expand. They grow in clusters, which are usually set at irregular intervals on the twig, a little below the terminal bud or buds. The blossoms are very small; each one consists of five minute purplish-red petals, five stamens of the same tint, and a seed germ made up of two dark brown and inconspicuous carpels united into a single pistil, which contains one seed only. The petals and stamens gradually turn brown and wither, while the flat winged seed-vessel, with its single seed, increases in size and changes in colour to a bright green.

THE LEAVES.

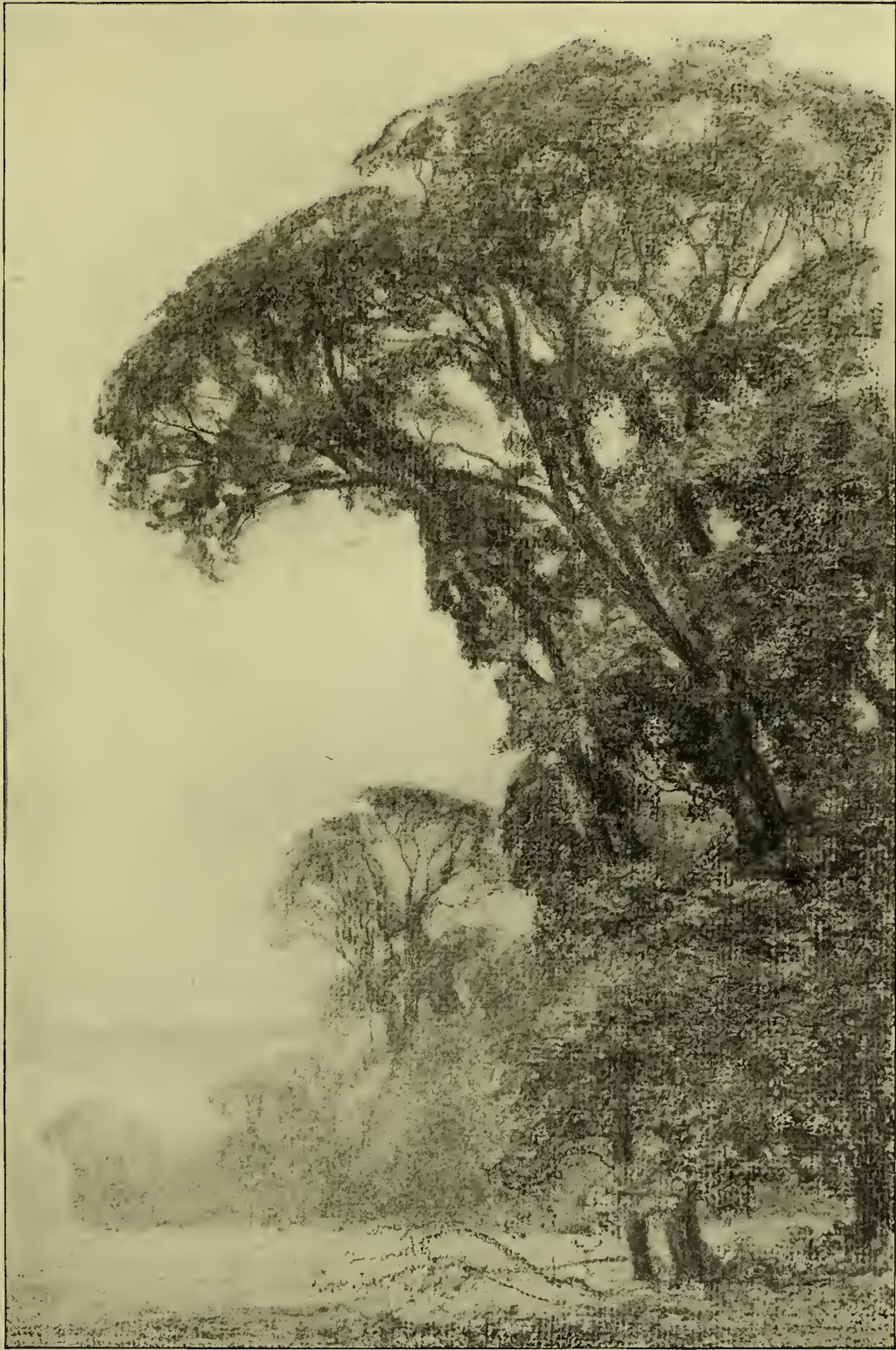
The young leaves are at first folded at the central rib against the new shoot of pale green tinged with pink, and turn downwards as

they expand. The delicate narrow green and pink stipules already mentioned serve to protect them, and are arranged in pairs. The colour of the leaf soon deepens from pale to darker green, and in autumn, after a day or so when its hue is golden, it takes a bright yellow tint. The upper surface of the leaf-blade is peculiar from its uneven (granular) texture. The main and secondary ribs only are conspicuous, except when strong sunlight shining through the blade discloses the net-work of smaller veins with which it is actually covered. The ribs on the under side, as also the new shoots, are covered with hairs, traces of which are still to be found on the twigs of the previous year. The leaf, with its fluted surface, is curved over from tip to base, and much puckered between the ribs. Its tip is pointed, its margin acutely serrated. The leaf-blade is carried down the stalk lower on the one side than on the other, and the margins of the two halves are not symmetrical at the base, the one being convex, the other concave.





THE YOUNG LEAVES
OF ENGLISH ELM.



ENGLISH ELM.



BOUGH OF
ENGLISH ELM.



FOLIAGE OF
ENGLISH ELM.



PLAN OF LEAF
(ENGLISH ELM).

THE ENGLISH ELM (*Ulmus Campestris*).

The small-leaved or common Elm prefers rather low-lying country in a moist warm atmosphere. It is seldom grown in forests, but is the typical hedgerow tree. Here it will reach a height of over 100 feet, with a girth of nearly 20 feet. Though the tree produces large quantities of seeds, only a small proportion germinate. Shoots from the roots and stems easily take root. Adventitious shoots are produced from every part of the trunk, especially where it has been lopped. The timber is extensively used for the construction of coffins. Parts of carts and wagons are occasionally made from it, though it has been generally superseded by deal, having fallen into disrepute among farmers for its want of durability.

THE WYCH ELM.



HARVEST.

Painted by Rex Vicat Cole and Byam Shaw, R I
(EX: ROYAL ACADEMY, 1893.)



THE WYCH ELM.

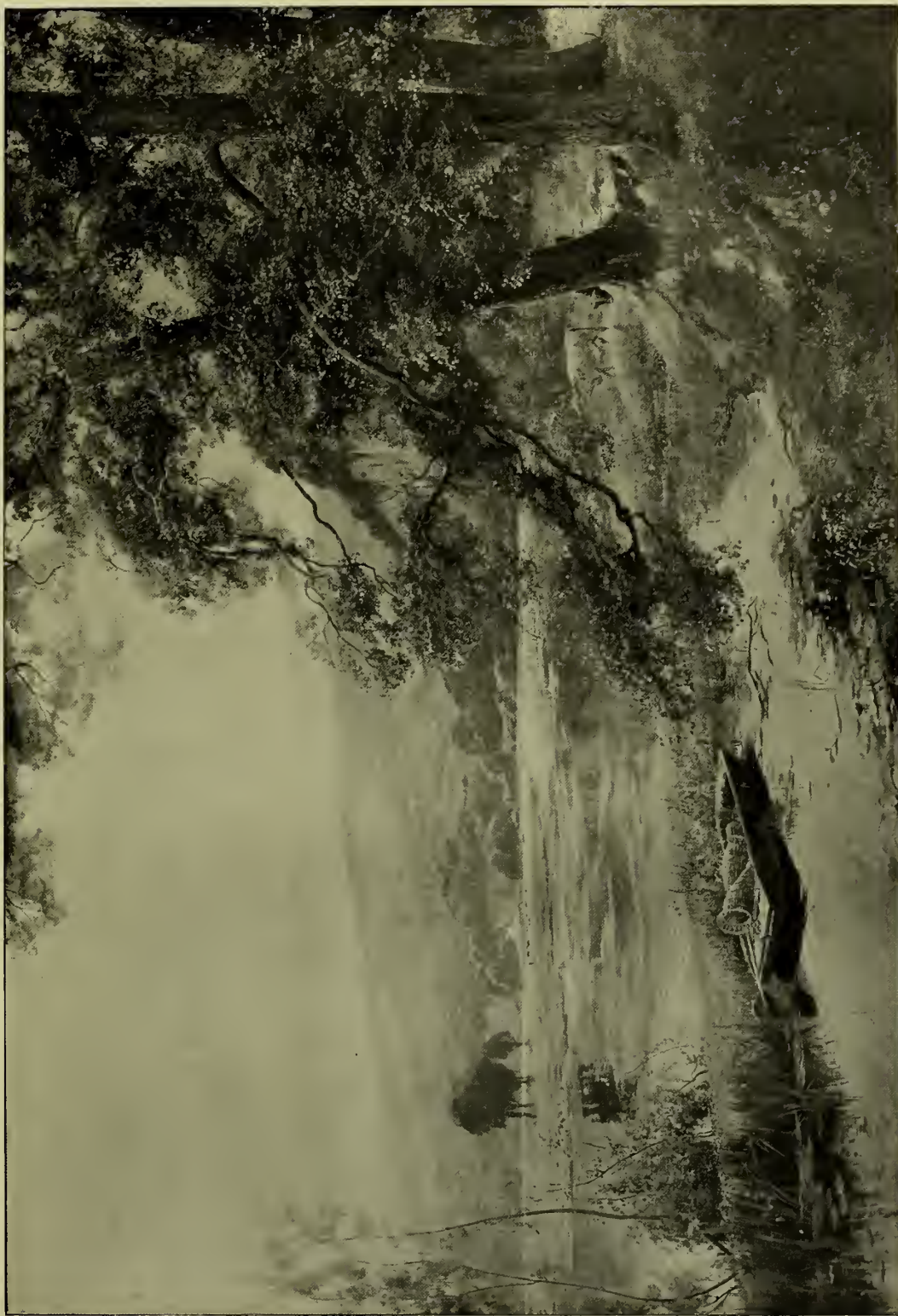


HE Elm stands guardian of the hedgerow, and its sturdy arms reach out over the bordering furrows. The year has newly begun; the weak sunlight of a winter's day falls on the clods of earth, thrown over and smoothed by the ploughshare; the pools of water which lie in the furrows hold grey earth-shadows cast by their sloping sides. From a bed of dry leaves, which now and again rise with a swirl and chase one another in circles, harried by the North-east wind, a few snow-drops are peering out. The purple grey of the elm-twigs makes a harmony with the sky.

The year is a month older, and the Elms are loaded with blossom. The crumbling soil lies level under the harrow, and the sower, with even stride, casts his seed. Now the lark takes up its joyous song once more: the leaves of "lords and ladies," like green arrow-heads, show in the hedges, and the Elm bears golden buds.

The year creeps on; there are primroses on the bank, a black-bird is building in the hedge, the note of the fieldfare is heard. On the plough-land, no longer brown and bare, a tint of blue-green proclaims the young wheat. A fresh green covers the Elm: the year has crept on to Spring. The soft early rains now do their part: the wheat lifts its slender blade, and the Elm twigs are hidden under a rich green mantle. The scent of the Rowan and the Hawthorns is in the air, and the birds sing day and night. The line of the hedgerow is marked out by the white fennel; from the meadow beyond it comes the pleasant burr of the mowing machine, and soon the overhanging Elm-branches will catch up stray wisps of hay from the loaded wains as they go creaking along the lane. It is full summer at last, and the wheat is golden in the shimmer of broad sunlight. How grateful now is the deep shadow of the Elm-tree foliage! A woman with her baby at her breast lies beneath it through the long day, while her good-man is reaping in the cornfield hard by.

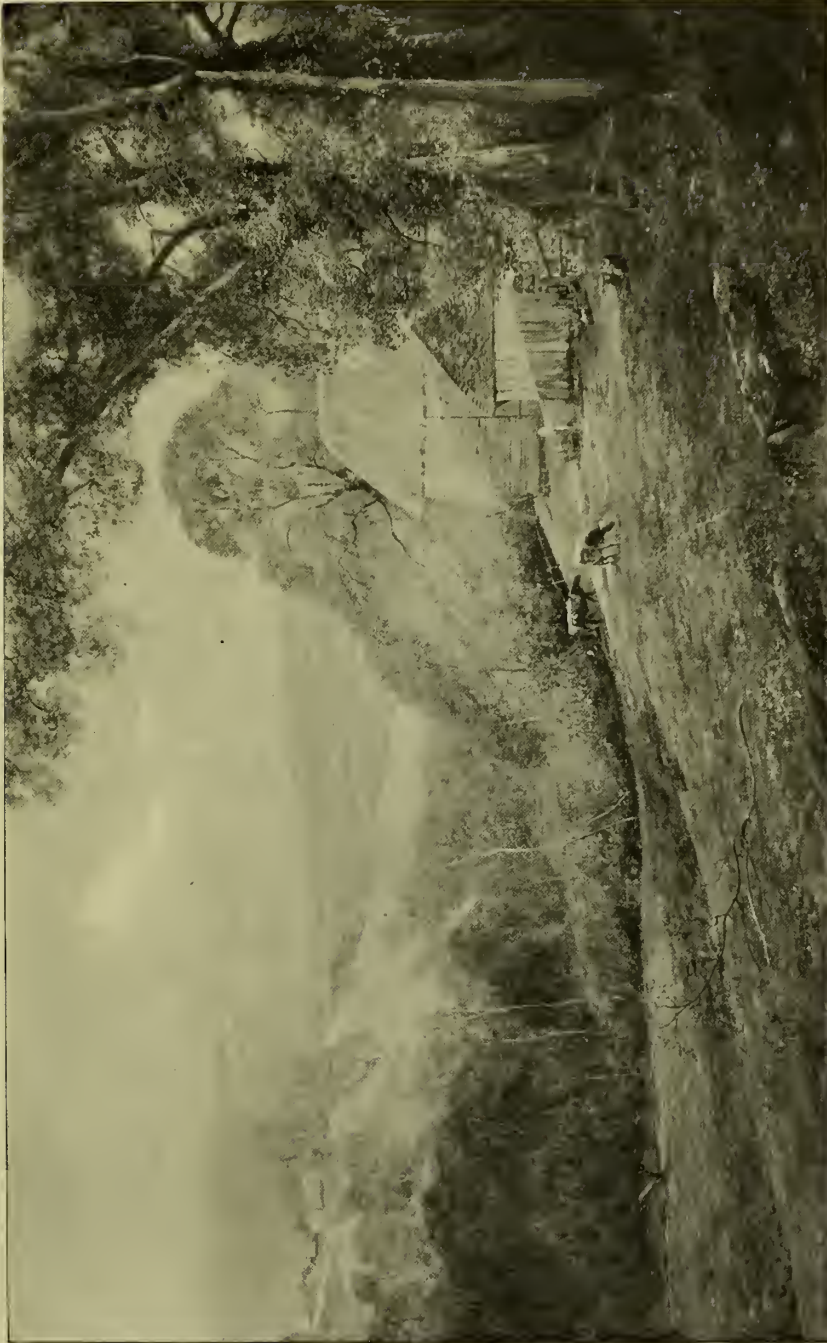
A partridge calls from the stubble. A shower of golden leaves flutter down from the Elm: once again the land lies ready for the plough. Another year is ended.



THE BRIMMING RIVER.

(Ex: ROYAL ACADEMY, 1905.)

*By permission of the Right Hon. Lord Crueshew,
the owner of the picture.*



THE WEALD OF SUSSEX FROM BRINKWELLS, FITTLEWORTH.
(Ex: ROYAL ACADEMY, 1906)



RAMIFICATION.

The trunk of the Wych Elm does not continue undivided for a great height, as so often happens with the English Elm. Instead of this it divides into large limbs, and its individuality is lost. Sometimes the division occurs at some distance above the ground, sometimes near it. The limbs spread outwards as they ascend, and, unlike the English Elm, those near the top of the tree extend the furthest. They often form long sweeping curves that are not found in the English species, and the lower boughs are usually pendent. The branches and twigs make twists and curves, and are far less rigid than is the case with the other species, where the branches ramify but little and end in a bunch of twigs which are divided from one another by a smaller angle, and are, by comparison, rather

stiff and stunted. The shoots on the young tree are conspicuous for their sturdy growth; their size is sometimes even disproportionate to the branch that bears them. The bark is paler in colour, and the twigs are smoother in texture than those of the English species. Large excrescences sometimes appear on the trunk.



THE FLOWER.

The buds containing flowers generally hold the lowest places on the shoot formed during the previous year.

In March or April, before the leaf-buds burst, the flower-buds expand and push aside the bud-scales, which soon fall, to disclose a number of florets radiating from a single point. The florets are crowded together, but as a rule rather less densely than is the case with the English Elm. Each little floret has a minute stalk, and is made up of five purple-red petals united into an elongated vase-shaped

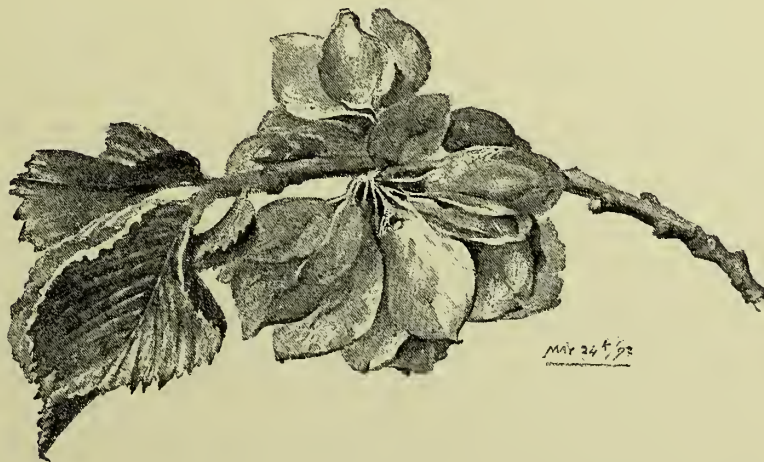


RAMIFICATION OF WYCH ELM AND FRUITS.

calyx which bears a small bract at its base. Inside each petal, and projecting beyond its tip, is a stamen with a purple-red pollen sack. The centre of the floret is occupied by a pistil, which divides into two carpels. Each floret is only about a quarter of an inch long. Occasionally the florets are unisexual, containing either pistil or stamen, but not both. The flowers of the Wych Elm appear later than those of the common Elm.

THE FRUIT.

The clusters of fresh pale green fruits which take the place of the flowers are well formed when the leaf buds are still lying unopened. Each fruit consists of a thin, flat, membranous wing, roughly oval or obovate in shape, with the end furthest from the stalk slightly notched. In the centre of this disc, contained between the papery layers of the wing, is the seed, which ripens in June in great profusion; only a small proportion is fertile. Elms begin to produce seed about the thirteenth year of their growth.



FRUITS OF WYCH ELM
(Natural Size).

It has already been pointed out that the seed of the English Elm is not placed so near the centre of the fruit ; and that the notch is deeper. Each fruit measures about three-quarters of an inch in length, and the whole bunch of fruit may be from two to three inches across. When the fruits begin to ripen the leaves have nearly expanded, and become flat, their normal position. Sometimes the fruit ends in a point instead of being cleft, or when cleft, both sides of the notch are pointed.

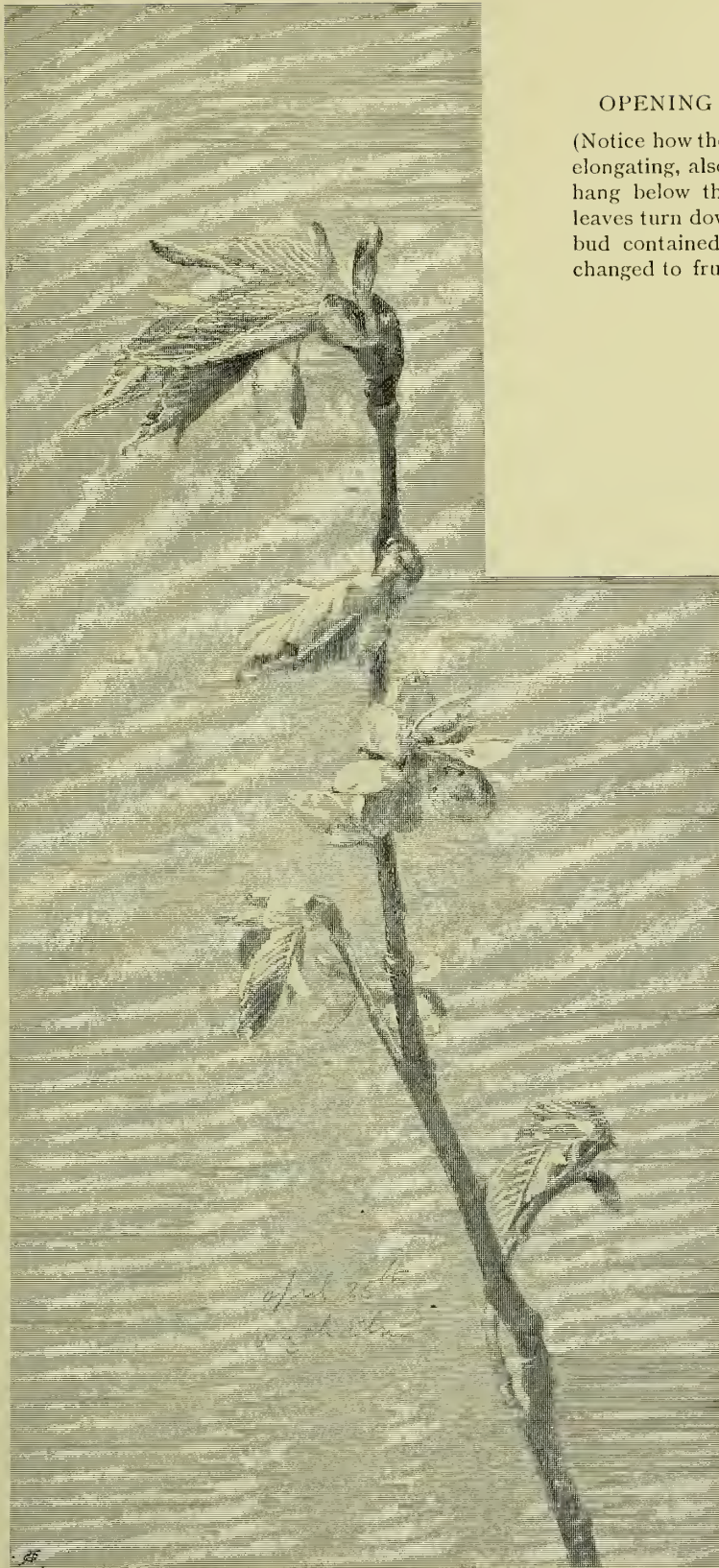
THE LEAVES.

The buds are covered by numerous scales : after they have expanded the outer scales fall off, while the inner ones and the true stipules continue to lengthen as the new shoot is formed, and the leaves develop. The stipules are often conspicuous for their bright pink colouring. The young leaves, which are easily to be distinguished from those of the English species by their length, narrowness and sharp point, turn downwards as soon as they burst from the bud. The blade between the secondary ribs is compressed into little flutings ; those on the one side of the central rib are folded against those on the other side, so that only the underpart of the leaf is visible. Soon the leaves and the stipules become separated on the pale-coloured young shoot. The position which young leaves take up when they first appear has been referred to many times.

It should be borne in mind that the different aspects of tree foliage in the Spring time are in a measure due to this as well as to the kind of fruits which are borne. The leaves of some trees, such as the Ash, Whitebeam, Holly, Wayfaring Tree, and the Guelder Rose, start life outside the bud-stage standing upright ; others consistently turn downwards. Typical examples of this arrangement are afforded by the Hornbeam, Beech, Hazel, and Maple. As this

OPENING LEAF BUDS.

(Notice how the stipular scales are elongating, also how the stipules hang below the leaves, and the leaves turn downwards. The third bud contained flowers that have changed to fruits.)



point is an important one in the study of foliage, illustrations of some examples are here given side by side. The new shoot of the Wych Elm, when some two inches long, begins to stiffen, the drooping leaves become more horizontal, and the stipules fall. The fully-developed leaf measures from four to five inches from tip to base; it is covered by rough hairs, and has a coarsely serrated edge, and a short stalk. The base of the leaf-blade meets the main rib higher up on one side than on the other, but this difference is not nearly so pronounced as in the case of the English Elm.

The leaves are set alternately on the twig in two rows, one on either side. Their colour passess through gradations of pale yellow-green in spring to the deep green of summer, and are pale yellow for a short time in the early autumn; after this they shrivel and turn brown before other trees have lost their summer tints. The leaf stalks are short.



THE YOUNG ELM LEAVES FURTHER DEVELOPED.



A



B

EXAMPLES OF YOUNG LEAVES
THAT TURN DOWNWARDS
BEFORE THEY TAKE UP THEIR
NORMAL POSITION.

A.—MAPLE.

B.—HORNBEAM.



A



B

EXAMPLES OF YOUNG LEAVES
TAKING AN UPWARD POSITION.

A.—GUELDER ROSE. B.—HOLLY. C.—WAY-
FARING TREE. D.—ASH. E.—HAZEL.



C

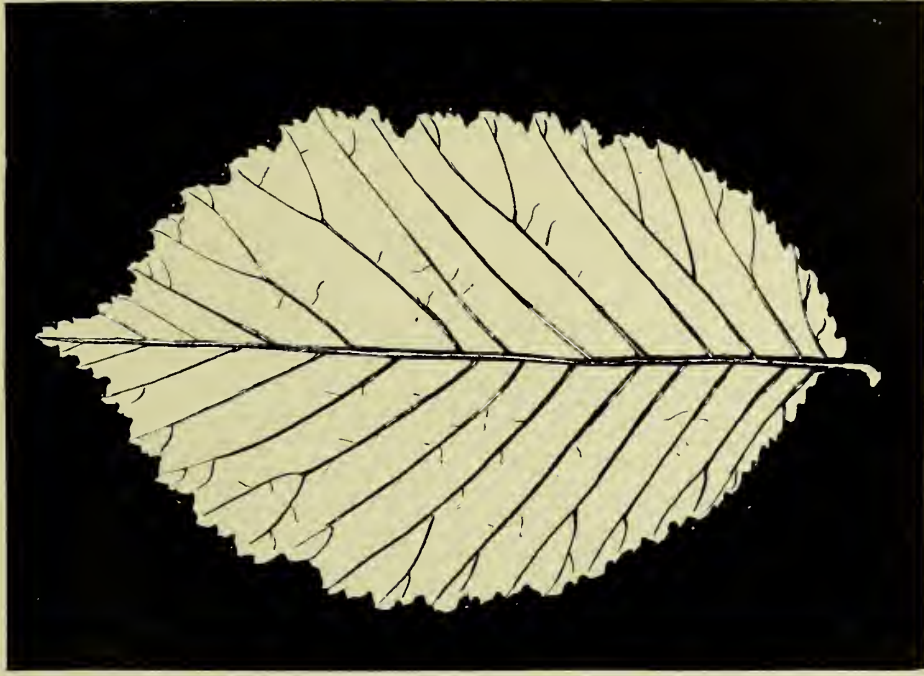




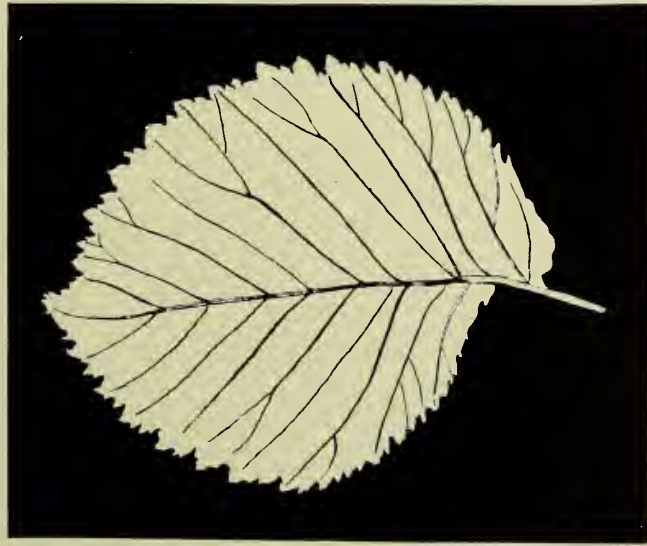
E
HAZEL SHOOT.

THE WYCH ELM (*Ulmus Montana*), also called the Scotch Elm, Mountain Elm, Witch Hazel.

There are many varieties of the Elm, some closely resembling the Wych Elm, others more like the English Elm. Four species are regarded as British, namely, *Ulmus Campestris* (English), *Ulmus Montana* (Wych), *Ulmus Stricta* (Cornish), and *Ulmus Saberosa* (cork-barked Elm). There is a variety called by foresters the Dutch Elm, and many crosses between the species. The Wych Elm grows rapidly, and under favourable circumstances will reach a height of 130 feet. It appears to be a native of Britain. It is usually propagated from layers, on account of the unfertility of its seed. The too rapid growth of the tree renders the timber valueless. All the Elms require a good soil for their proper development, nor can they withstand great drought. The Witch Hazel of America is a totally different tree.



WYCH ELM



PLAN OF LEAF, ENGLISH ELM.

PLAN OF ELM LEAVES.



DOWN THE GREEN LANE.
(EX: ROYAL SOCIETY OF BRITISH ARTISTS, 1906.)

THE MOUNTAIN ASH.



ROWAN BERRIES.



THE MOUNTAIN ASH

(OR ROWAN).

GENERAL REMARKS.

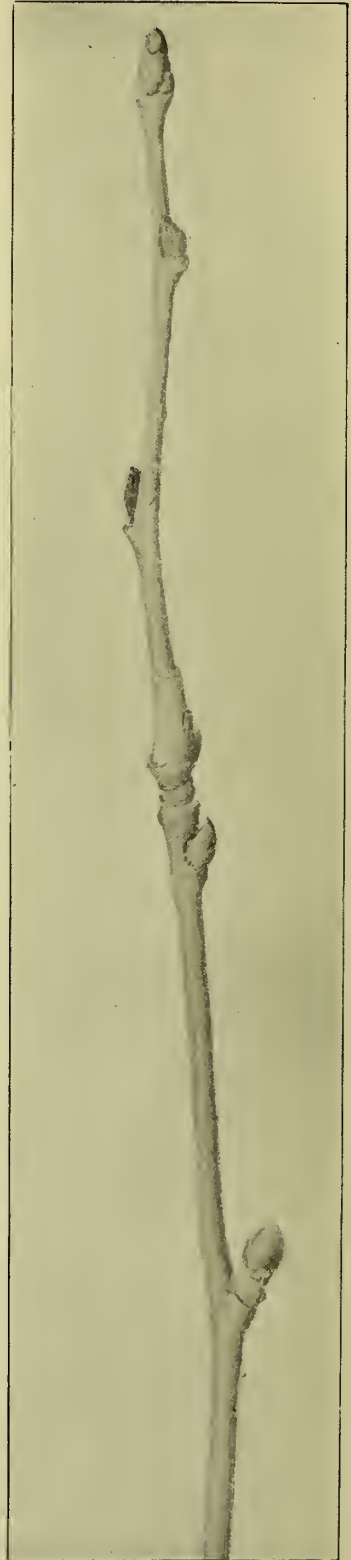


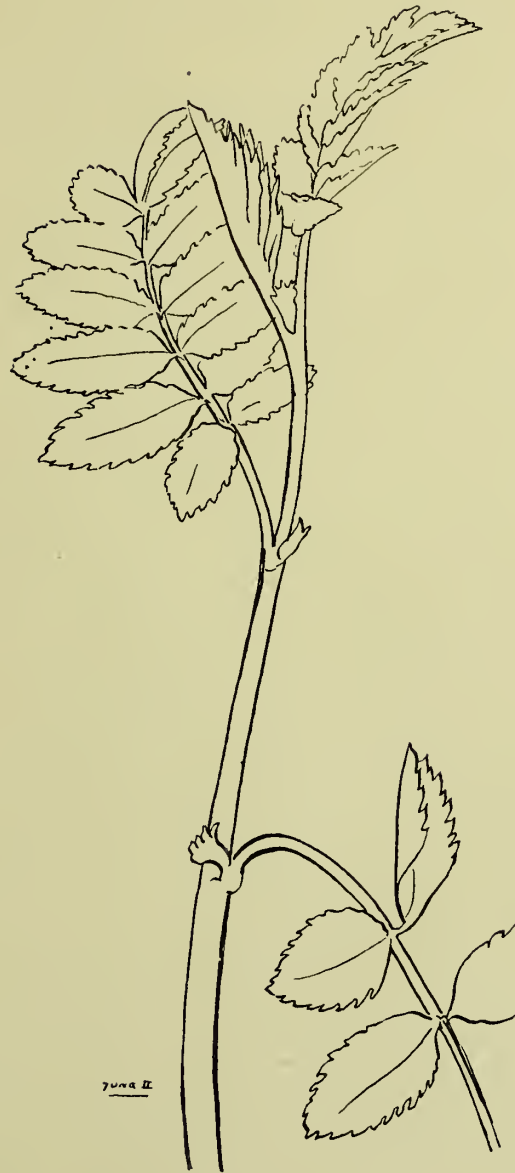
WHO that has felt the magic of the woods, and all but seen a fairy where some leaf twinkled, or startled the revels of elves and pixies from the mossy mound at the roots of a hollow beech, can wonder at the tales of mystery that have grown up everywhere about trees. Sometimes they are the kindly traditions of healing powers, such as the scars on some aged ash, inflicted in its sapling days, still bear witness to: sometimes those of old-time religions, such as invested the world-tree of the Norseman, with its twisted roots linking heaven and hell, the sacred Oak of the Druid, or the Hazel of the Celts, with its scarlet nuts. In the North Country superstitions of a darker kind are hardly yet extinct, and linger especially about the Rowan Tree.

“Rowan tree and red thread
Haud the witches a’ in dread.”

THE NEW SHOOTAND HOW IT GROWS.

In winter the shoot of the previous season attracts notice by its brown colouring and the swelling, encircled by ridges, at its base, where it joins the older branch. The long, curved buds are of a mealy grey colour and placed, at long intervals, on alternate sides of the shoot: they expand early in April. In its early stages the new shoot is very gaily coloured: at the point of its junction with the branch (now a sober silver-grey or brown) it is bright red, and above this point it displays tints of purple and green, partially softened by the white down which also gives a shading of silver to the petiole and to the yellow-green blade of the young leaf. The main mid-rib, a continuation of the leaf-stalk, is at first upright. At this stage each leaflet is folded together at its central rib, and the whole set of leaflets on one side of the leaf-stalk are laid flat against the corresponding set of leaflets on the other side of the stalk, while all point upwards towards the terminals. When the leaflets separate and unfold, the mid-rib which bears them all bends downwards, and as they flatten out and stand away from it, it gradually takes a curve in the same plane.

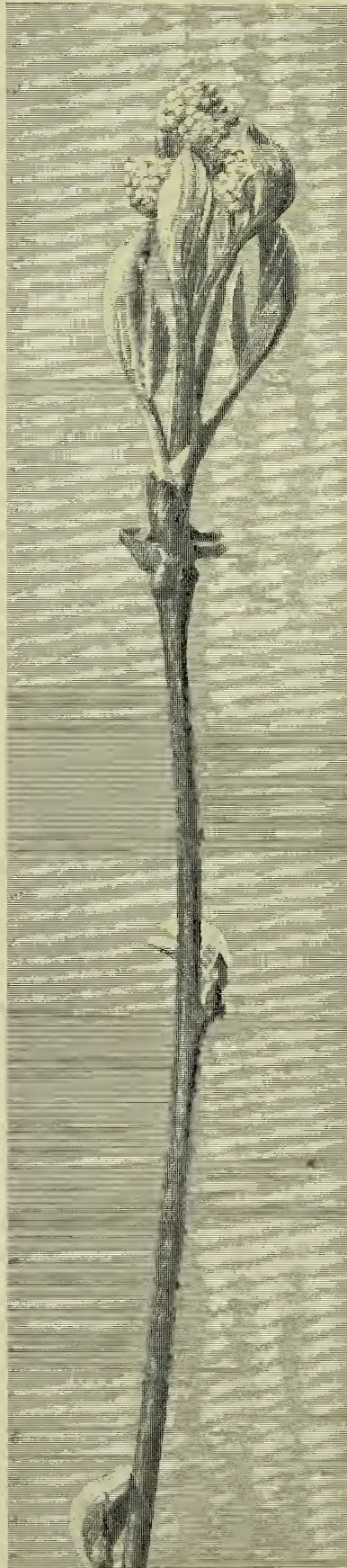




At the base of each leaf a modified leaf or stipule is often found, a small wing-shaped appendage, green in colour and deeply serrated.

THE FLOWER AND FRUIT.

In the beginning of May the flower-bud which terminates the new shoot, and the young leaves grouped around it, together make



OPENING
FLOWER BUD.



THE FLOWER.

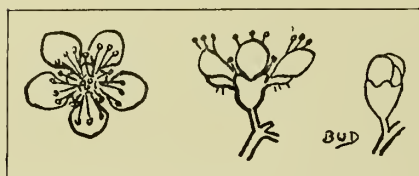


BRANCH WITH FLOWERS.

a beautiful and slender cup-shaped form, of which a drawing is given. By the middle of the month the flower heads have begun to separate. The stout upright new shoot now fulfils the office of a pedicel; from some point near its base, it gives off a leaf with a bud in the axil; again curving slightly away from this point, it produces another leaf, with a flower-pedicel in its axil; yet another slight deviation in the direction of its growth, and a further point is reached, where a leaf and a flower-pedicel formed in similar manner appear. So it continues upward, giving off at intervals, and from every side, other flower-bearing stalks. These secondary pedicels bear shorter pedicels, and these again shorter ones, to which the floret-buds are attached in clusters by minute stalks. The buds are downy, and in colour pale green tipped with yellowish-white. By this time the leaves are almost fully developed, and lying flat in the way already described, and the flower heads begin to droop from the weight of the buds. Each head is some five or six inches in diameter, and made up of

numberless florets. The whole cluster has a most dainty and feathery appearance, which it owes to the long slender cream-coloured stamens, of which every floret bears no less than twenty, and to the white anthers and yellow pollen. The petals are set wide apart, but the effect of raggedness which this produces in the blossom of the Blackthorn is here avoided, so wide-spreading are the stamens, and so closely are the florets packed together.

Each floret has a pale green calyx with five yellowish toothed sepals; between these teeth grow the cup-shaped petals, bent sharply



back from the base. Opposite every petal are three stamens with long spreading filaments, and opposite each sepal one stamen, with a shorter filament, making

twenty stamens in all. The pistil is found in the centre of all. It bears three erect white styles, placed close together, and surmounted by four pale yellow stigmas. At its base the tiny round green germ of the future berry can be distinguished.

Elaborate as is the construction of each floret, every part being visible to the naked eye, it is yet only a quarter or half an inch in diameter, and but one in a crowded cluster some six inches across, while the tree is thickly covered with such clusters.

The berries in September make a brave show with their scarlet colouring. The dense clusters of them, which replace the flowers, force the shoot down by their weight. The berries resemble little apples, and are about a quarter of an inch in diameter. They are greedily eaten by birds.

THE LEAF.

When the leaf is fully developed it occupies a slightly drooping position, with a tendency to become horizontal. It is made up of a terminal leaflet, and of seven or eight opposite pairs of



ROWAN BERRIES.

leaflets, which are all smooth and in colour a dark green on the upper surface and grey-green on the under.

Though the leaflets have no foot-stalks of their own, they often lie close together without overlapping. The portions of the leaf-blade on either side the mid-rib in each leaflet do not exactly correspond; only the margin of the lower portion extends as far as the mid-rib which supports all the leaflets; the other edge never meets this common mid-rib, but, at some little distance away from it, curves round and joins its own mid-rib. In the space thus gained the blade of the leaflet immediately above it can comfortably lie. In this respect the leaf differs from that of the ash, which in many ways it nearly resembles; the leaflets also are less pointed, more deeply serrated, and darker in hue.

The mid-ribs of the leaflets are pale green and slightly downy, each with a tuft of brown hair at its point of junction with the main rib. The petiole at its base, where it is swollen, is coloured a rich crimson, which changes to brownish-red near the leaflets.



LEAF OF SEEDLING.

The fern-like leaf of the seedling is interesting as an example of the difference in form shown by the early leaves and those that follow after.

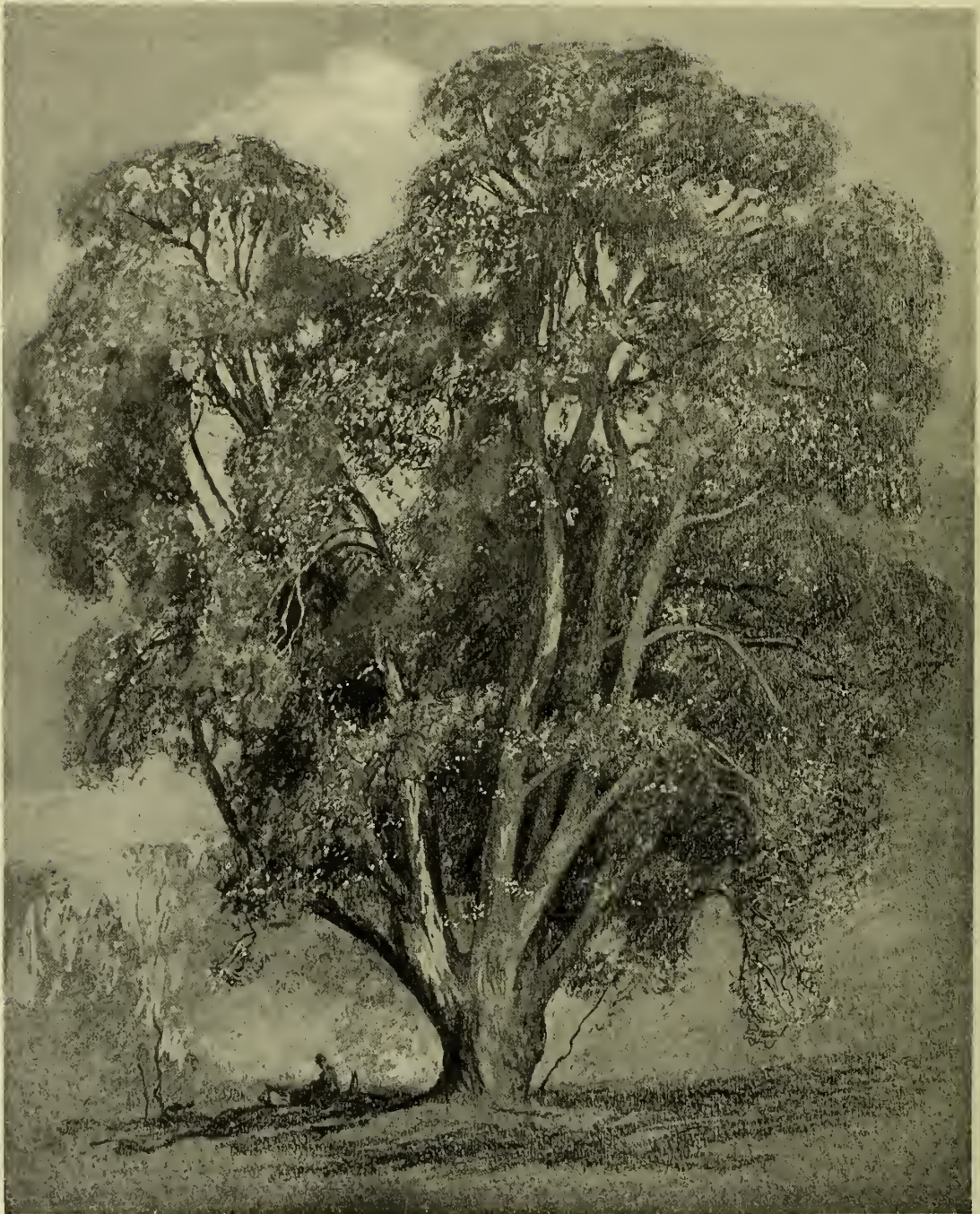
THE ROWAN.—*Pyrus aucuparia* (also called Fowler's Service Tree and Quick-Beam).

The Rowan grows to a height of 40 or 50 feet, the smooth trunk of silver-grey is well-defined throughout its height, and is marked with horizontal cuts. When young the tree grows rapidly, and forms a bushy head. The branches incline upwards, making rather a small angle with the trunk.



PLAN OF
ROWAN LEAF.

THE HOLM OAK.



HOLM OAK.

THE HOLM OAK.

GENERAL REMARKS.



THE Holm Oak stands in an old-fashioned garden, a garden that is which has outgrown Fashion, where no one asks if the flowers are the fancy of the moment, since all flowers that are beautiful and fragrant have a place there, and half its charms have sprung from the fancies of folk forgotten long ago.

No one can say how long the Holm Oak has been there. It was perhaps planted when arbours and hillocks and geometrical flower-beds had the homage of all garden-lovers. As a young tree it stood by a trim bowling-green, and drew less admiration, one may be sure, than the clipped yews which made a background for the sundial, or the leaden figures of shepherd or shepherdess, transfixed in a never-ending dance, beside the stately terraced walks.

When the yews and the sundial made way for streams and rockeries, and the avenues for twisted paths which lead to unsuspected grottos and mock ruins, for a few summers and winters the dark branches of the Holm Oak were reflected in the water of an artificial lake. Then simpler tastes prevailed; once more, and for the last time, Fashion busied itself about the garden. It would be a ruthless hand now that disturbed the perfect setting of the dark Ilex. Measured by some of its tribe it is a young tree yet. The traditions of Rome ascribe to the sacred tree at Tibur no less than 1200 years, and to the tree in the Vatican garden 800. But old or young the tree is full of beauty, with its branchlets trailing to the ground from low horizontal boughs, and its grey branches bearing masses of little grey-green leaves. Only Holly leaves are at once so dark and so

bright. And something in the form of the leaf, and the bush-like shape of the tree, also brings the Holly to mind, no less than the pendent branches and the evergreen foliage.

RAMIFICATION.

The bole in old trees is massive and covered with a somewhat corky irregular bark. The bark on the boughs is comparatively smooth and thin and grey in colour. The bole usually divides into massive limbs a little way above the ground. The lower boughs which spring from these are commonly horizontal, or drooping at the ends, and give off straggling pendent branches. The lower boughs somewhat resemble those of the Oak, but the upper ones are quite unlike it, and their long simple lines show none of the rectangular turns that are so characteristic of it. The method of growth of the Holm Oak can best be understood by the study of a branchlet. In Autumn a typical branchlet includes three or four twigs, some four to six inches long, which spring from points quite close together at or near its apex. Some six projecting scars at different points along the twigs mark the place of former leaves or flowers. At the apex of each twig is a group of new shoots, each with its complement of about six leaves set apart, and a bunch of three terminal buds. In the axils of some of the leaves are the footstalks of acorns; in others minute buds. A new shoot should now be compared with the older wood of the twig, and with the still older wood of the branchlet. The new shoot, as has been said, terminates in a group of three buds: but, on the other hand, the twigs that spring from the branchlet are set slightly apart from one other. This apparent difference between the position of the buds and that of the ensuing twigs is due to an imperceptible length of shoot between the buds



FLOWER AND NEW SHOOT.



ACORNS AND CUP.

having increased with the growth of the branchlet. Again, though some six leaves with axillary buds are found set along the shoot, there are not six shoots springing from corresponding points along the twig, as would be the case if every bud in the axil of a leaf produced a shoot. Instead of embryo shoots, some of these buds held the flowers for the season to come, and growth stops at those axillary points where acorns are produced. The fact that the twig from its base to the base of the new terminal shoot is destitute of shoots is thus accounted for. Irregularities of growth, due to many causes which have been detailed in the descriptions of other trees, must be borne in mind to make the study of the Holm Oak complete.

FLOWERS AND FRUIT.

About the middle of May the flowers appear in the form of hanging catkins. The catkins are crowded together so that they form tassels, each of which may be from two to three inches wide and one to four inches in length. The flowers look like a number of little pale yellow-green balls clustered round the main pendent support.

The female catkins consist of a central support bearing from five to eight flowers, but only from one to three of these become acorns. The female catkins are borne on the newly-formed twigs. The acorns are a long oval in shape and narrower than those of the Oak. They are a rich shining brown, and take two years to ripen. The cup in which they are set conceals about one-third of their length, and is covered with small downy pointed scales. About the end of July, when the acorns first become noticeable, they are the size of a small pea. Their dark tips just project beyond the capsule, which looks dusty from the brownish-white down that covers it.

LEAVES.

Towards the end of May the branchlets are tufted with several new shoots. These and the upper sides of the young leaves are a pale green with pink tints, while the under sides of the leaves are nearly white, and all have a dusty look due to the hairs which cover them, and which are not silky like those of the willow leaf. When the sun shines through the young foliage it appears a very pale olive green. The leaves are arranged singly on rather short footstalks, each of which bears a pair of narrow withered-looking dull brown stipules at the base. The new shoots are now some five inches long, and furnished with bunches of hanging catkins. Both they and the leaves with their soft texture and pale colouring form a very striking contrast to the mass of older dark green leaves from which they stand out.

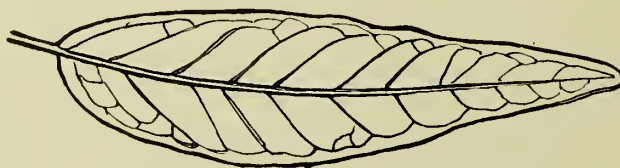
A month later and the young leaves have become stiff and leathery. Their upper surface has changed to a glossy very dark green, with the mid-rib showing a brighter tone. Their lower surface still looks dusty, though the hairy coat is greener than it was earlier in the year; the main-rib appears clearly marked as a raised cord, the secondary ones are less obvious. The leading shoots are now six inches long, the others shorter, three to four inches only. The mature leaf measures from two to four inches in length by half an inch to an inch in width. It tapers at both ends, but more abruptly at the base, and one edge of the leaf-blade often extends farther down the footstalk than the other.

Usually the edges are smooth, though sometimes they are serrated, and the two forms may be found either on individual trees, or both on the same tree. In the latter case it is usually the lower leaves which show the serrated edge.

The point of the leaf is often turned to one side, and the leaf bowed and twisted, but not puckered ; more rarely it is perfectly flat. The two halves of the leaf-blade from the central rib to the margins lie in one plane, instead of forming a wide spread **V** as is so often the case with other trees.

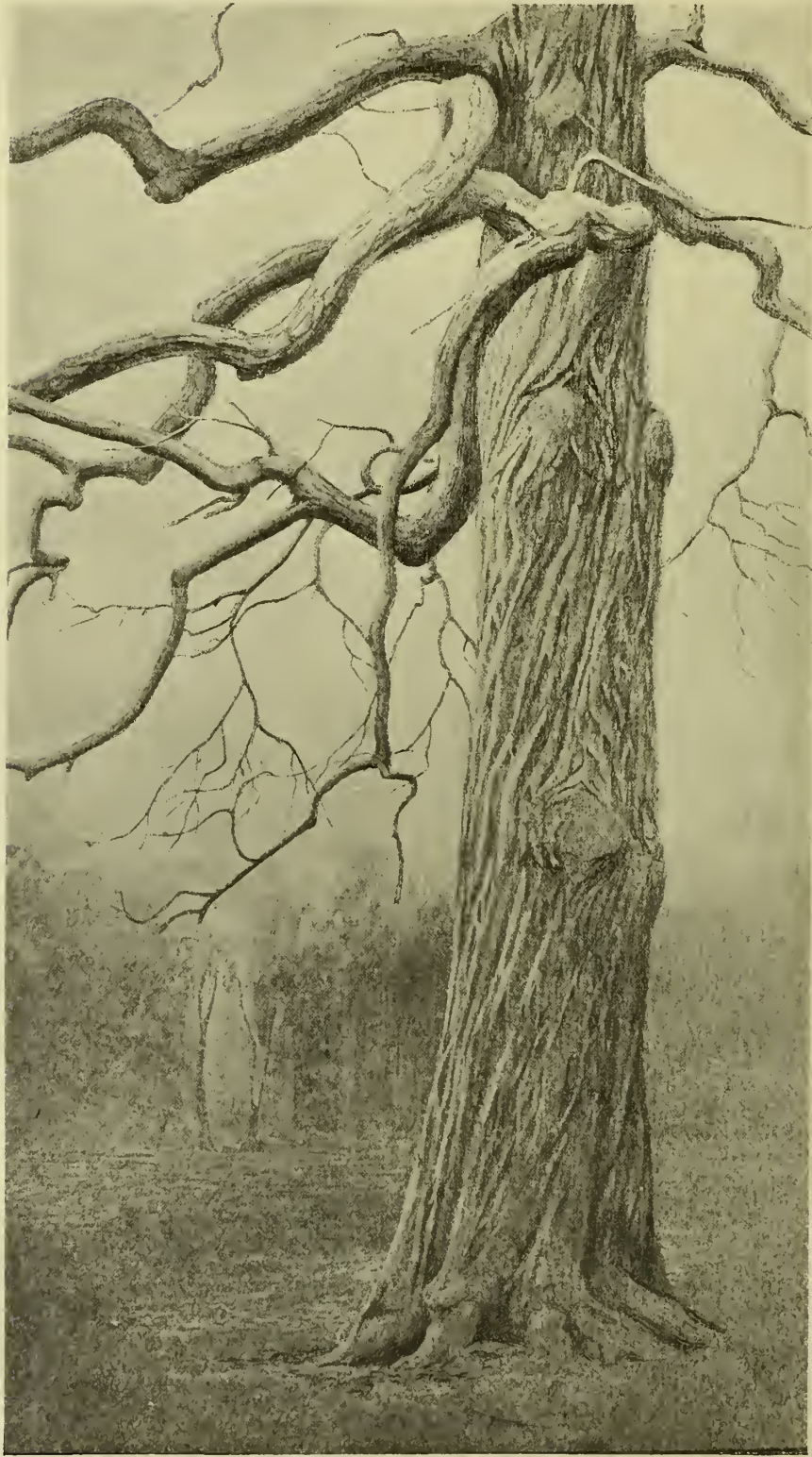
THE HOLM OAK (*Quercus Ilex*).

The Evergreen Oak (also called the Ilex, Holm, and Holly Oak) is said to be a native of Southern Europe and North America, and to have been introduced into England at the beginning or middle of the sixteenth century. The seedlings grow rapidly, though they are easily injured ; after the first few years the annual growth is very small. The tree lives to a great age, and under favourable conditions will reach 50 or 60 feet in height, though more usually it is only half that height : it will live by the sea-coast. The timber is valuable, being close of grain and flexible, and from its slow production very durable. It withstands the effect of smoke well. In the opinion of some writers this tree is a variety of the Oak mentioned in the Bible, but it is more generally held that the Oak of Palestine, though bearing a great resemblance to the Ilex, is a distinct species.



PLAN OF LEAF.

SWEET CHESTNUT TREE.



CHESTNUT TREE.

SWEET CHESTNUT TREE.

THE CHESTNUT COPSE.



IN the murky airs of a winter's morning the bridle-path through the copse lies like a grey-white thread, scarcely defined by the bordering shoots of the gnarled Chestnut stools. The bunches of dried leaves, stiff with hoar-frost, crackle under foot, and layers of ice between the powdered grass-tufts yield with a miniature report. With the dawn the deathly chill begins to lift, and the Chestnut shoots on the edge of the path stand silhouetted against a mass of others which cover the slope. There is the twitter of birds and the song of a robin. Soon shafts of sunlight make the pathway glitter, and long blue shadows fall across it from every clump of grass. The frost gives way, and footsteps in the grass leave a wet green track. A crowd of tits are busy with the handful of corn the keeper threw out as he went by.

* * * * *

When the open land is swept by March winds, the sheltered slope beside the bridlepath in the copse is gilded with daffodils, and the path itself outlined by massed primroses.

The delicate purples and greys of the Chestnut shoots blend with the distant hills; the shoots, with their vigorous growth, rise

from lichen-covered stools standing in a bed of grey leaves. The red and yellow leaves they carry are edged like a fish's fin. All about in the copse huts with faggots for walls and a thatch of chips have sprung up. Men and boys are cutting the Chestnut rods, which boys inside the huts split for use. Neat bundles ready for the hooper are stacked, and glisten white in the sunlight; rougher jagged bundles of chips ("bunts") lie near. At night the light of a lanthorn gleams out from a hut where some woodman is cutting up the chips for firewood ("kindling"). The raucous squall of a vixen and the hoot of an owl come from the depth of the wood, and one hears the slight rustle of some animal crossing the path. The old Oaks which stand up among the Chestnut rods take fantastic forms dimly seen against the blue-black sky. The wood is full of unseen life, and the elves hold their revels.

* * * * *

The greys and purples of the spring have changed to a monotonous bright green. It is June, and the foxgloves are half as high as the woodstacks. The Chestnut leaves begin to wear their summer gloss. They are as large as one's foot, and form an impenetrable barrier on either side of the path behind a border of sweet scented bracken up to the thigh. You pass a row of coops and the young pheasants bear witness to the eggs collected in the copse.

* * * * *

The sultry heat of August beats down on the scorched bridle-path—now a mere cutting between walls of dark green that shut out the air. There is no sound of animal life, no sound of any kind, until the massed clouds riding one against another bring a far-off

rumbling, and then a near clap of thunder, which is echoed every time by the frightened chatter of the cock pheasants.

* * * * *

The path is strewn with the shapely yellow leaves of the Chestnuts. Those on the standing rods are turned to gold and flame by the low sun. The noise of beaters and guns comes from below. The year is waning.

* * * * *

Once more the Chestnuts stand bare. Up the valley comes the music of the hounds, and scarlet coats are dotted among the trees. The woodman begins his work again and fells the copse of five years' growth.



GENERAL DESCRIPTION.

The Chestnut Tree has two very distinct forms. The one which is most characteristic of it as found in this country, possesses a lofty trunk, proportionately stout, and undivided almost to the top, it may be to a height of 80 feet above the ground.

The lower limbs take a downward direction from the point at which they may first be distinguished from the trunk, and spread away to a distance equal to about one-third of the height of the tree. The branches which they give forth ramify towards the tip into a number of smaller branches, which hang down to the ground. In contrast to this arrangement the ends of the lower limbs sometimes turn abruptly upwards.

The boughs which spring from the central part of the trunk at first incline upwards, and then follow the downward trend of the lower limbs, although they ramify at an earlier stage. These central boughs spread to the same distance from the trunk as do the lower boughs, or slightly further. The upper boughs are, each in succession, somewhat shorter. They also ramify more freely and generally incline upwards, though they carry hanging branches. As a result of this branch formation, the outline of the tree is shaped like a blunt cone. The trunk is of enormous size in comparison with the boughs it supports, and the boughs seem over-large for the branches. In other words the transition from trunk to bough and from bough to branch is unusually abrupt, and shows none of that exact gradation which is so delightful a feature of many trees. But when seen near at hand the strength and massiveness of the trunk and lower limbs are impressive. The boughs are stiff and contorted, and assume many grotesque forms. The rough bark on the trunk takes fine spiral lines which are very ornamental; it is



ONE FORM OF
CHESTNUT TREE.



THE BOLE.

sometimes varied by smooth stretches. In some cases the column itself is deeply fluted.

In the other and less usual form of the tree, the trunk divides sooner, perhaps at 20 feet above the ground, into large limbs, and the minor ramifications are graduated in better proportion than in the form first described. This gives the tree in winter a faint resemblance to an Oak, but the illusion is quickly dispelled by the hanging branchlets. When pollarded the tree presents yet another aspect. The poles with their upstanding lines spring from the stool in a sweeping, unbroken curve, and are flattened at the base. In colour the older ones are a dark purplish grey; the grey of the younger poles is tinged with purple or red, and at a still earlier stage they are bronze-green.

The ringed marks upon the poles (which show the position of former twigs), and the vertical lines between them (which represent the raised portions of the deeply-fluted young shoot) are in their way decorative.

ARRANGEMENT OF THE LEAVES AND TWIGS.

Between the brackets from which leaf-stalks have fallen away, the year-old twigs on a Chestnut tree are nearly cylindrical. These brackets project from two sides of the twig and are arranged alternately; consequently the leaves are found in two ranks. On an upright twig they lie horizontally, so that the ranks are parallel to one another, but the leaves are not in the same plane. On the horizontal twigs they also form two ranks and lie in one plane; their midribs are set at half-a-right angle with the twig, and by this means the margins of all the leaves in one rank touch one another, as do those in the opposite rank, and thus, with marvellous economy of space, each leaf is clear of its neighbour and can obtain light and air.



SHOOT FROM A
POLLARD (Natural Size).

On the shoots of a pollard the arrangement is quite different. From each leaf-scar to the leaf-scar next below it in line three sharp keels, with a deep incision between them, are scored down the twig, one keel from the centre of the scar and one from either side. The scars are scattered irregularly on the pollard twig, and form three or more rows, unlike the two well-marshalled ranks on the tree; the twig is not cylindrical, but of a form best explained by the drawing. In the Autumn the colour of the pollard shoots is bronze-green, during the following year they change to glossy purple-red, or to a rather dusty greyish purple.

Although the regular arrangement of the foliage described is found on all the vigorous twigs and shoots, on stunted twigs the leaves are necessarily crowded into bunches and obliged to take a variety of positions in search of light.

DEVELOPMENT OF THE LEAVES.

In April the large leaf-buds bear away from the shoot; but their tips curve in again towards it. As they open, the backs of the young leaves can be seen coloured a pale reddish-green, or sometimes showing brighter tints of yellow and red; the leaves are folded at the mid-rib. The new shoot which bears them turns downwards as it grows, and the young unopened leaves which hang at its

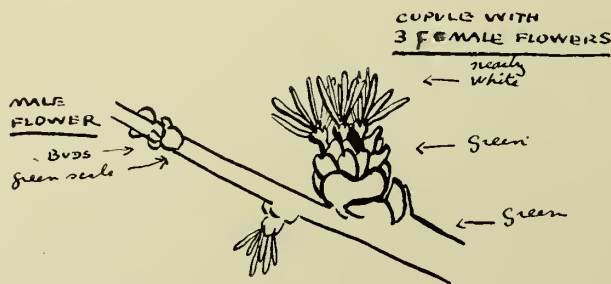
tip are conspicuous for the contrast between the straight line of the mid-rib and the sharp spiny margins of the blade, which are still folded together. The leaves at the base of the shoot, which were the first formed, now begin to flatten out. Two narrow pointed green stipules spring from the base of each leaf-stalk ; they turn brown and papery and fall before the leaf has ceased to grow. The new shoot is now of a bright green.

THE FLOWERS AND FRUIT.

The catkins appear about June on the new shoots. Male and female flowers are produced on the same tree, in fact on the same catkin, though the catkins do not all carry female flowers. The male flowers occupy the chief part of the catkin, the female flowers being found only near its base. The catkins spring singly from the axils of the leaves ; each one consists of a green, stiff, twisted axis, usually either horizontal or hanging, but occasionally upright, which is about one-sixteenth of an inch in diameter and four to seven inches long. At intervals down its whole length it is studded with pairs or groups of flowers.

The *Male Flowers* are very plentiful. Each flower is made up of many florets, and each floret consists of a calyx of five or six yellowish green scales, from which project a number of thin stamens tipped with sulphur-coloured pollen sacs.

The *Female Flowers* are comparatively scarce. They are usually



found on those catkins which spring from the axils of the leaves nearest the apex of the shoot. The flower is made up of a cupule of bracts covered with prickles, which encloses the



FROM A TREE.

FROM A POLLARD.

TWO CHESTNUT SHOOTS.



THE YOUNG LEAVES
FURTHER DEVELOPED.



THE YOUNG LEAVES
AND NEW SHOOT
FURTHER DEVELOPED.

bases of two or three florets. Each floret consists of a calyx surrounding an ovary, from the tip of which six pale yellow stigmas project. As the fruit develops, the prickly cupule completely encloses it, though the withered ends of the stigmas are still to be seen projecting from the part furthest from the stalk. When the fruit is ripe the cupule splits into four portions, disclosing its inner lining of silvery silky hairs and three red-brown and glossy nuts, with silky tips, set in a row. The central one has flattened sides, against which the inner sides of the other nuts fit closely.

The bunches of sulphur-coloured catkins starred over the whole tree make a brilliant display among the rich green leaves, and give it a unique appearance. The flowers are well seen, as from the drooping habit of the branchlets, they are set, for the most part, in front of the leaves.

THE LEAF.

The half-grown leaf has already been described. The mature leaf (in August) has an intensely rich dark-green upper-side and a bright green under-side; both surfaces are unusually glossy. The leaf is widest at a point two-thirds from its base; its average length is about eight inches. The main and secondary ribs are very distinct. The main-rib is a pale green colour and projects considerably from the under-leaf surface. Where the secondary ribs touch the margin of the leaf there is a sharp point. The blade between these ribs is fluted on the under-side, and consequently convex on the upper-side, while the veins which connect the secondary ribs also pucker it slightly, and its two sides from the central rib are sometimes inclined upwards. The ribs near the base of the leaf do not reach the margin, as do those near the apex, but turn off suddenly in a line



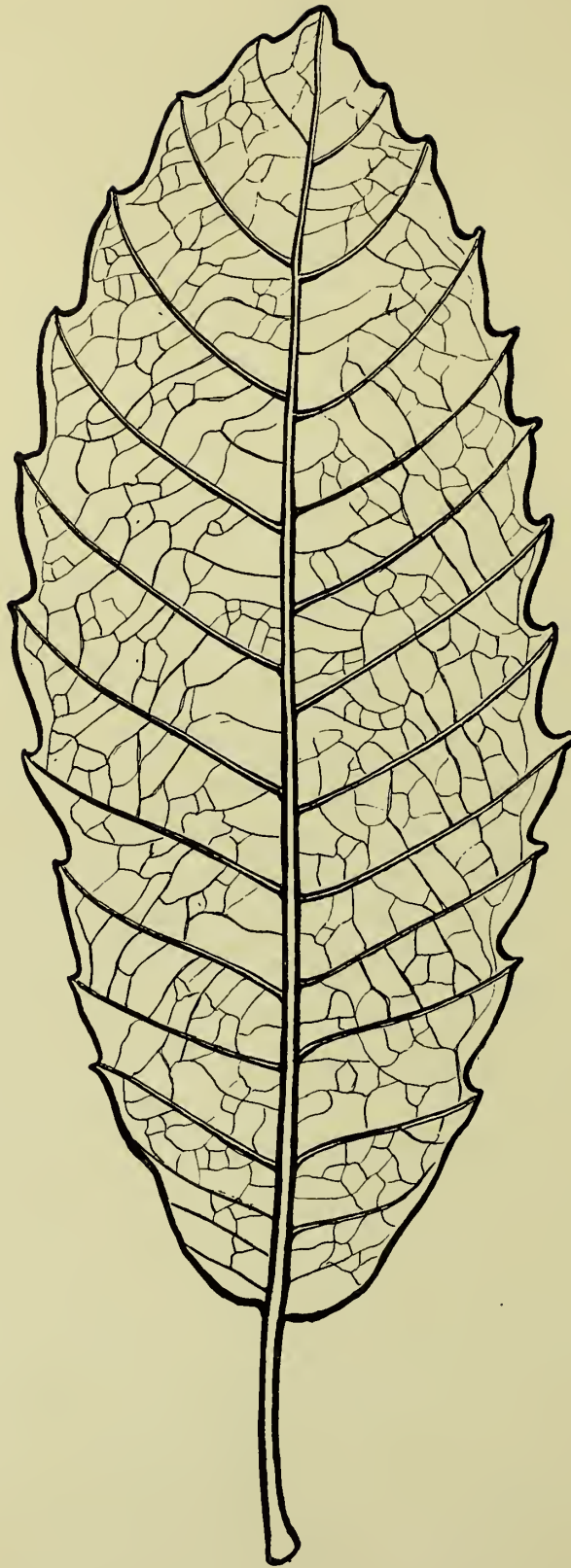
THE CATKINS.



THE FRUIT.



BRANCH WITH LEAVES
AND CATKINS.



PLAN OF LEAF.

parallel to it; and for a little distance from the leaf-stalk the margin is destitute of the sharp points and merely waved. One margin begins further down the leaf-stalk than the other, but both start from it in a concave line which changes almost immediately to a convex one. The widest part of the leaf is reached by regular steps, the width of each being determined by the secondary ribs. The diminution in width towards the tapering apex is equally regular. Most of the leaves lie vertically, some are drooping, those near the top of vigorous shoots incline upwards. A leaf is sometimes bowed from base to tip.

THE CHESTNUT (*Castanea sativa*),

Also called the Spanish or Sweet Chestnut, was probably introduced into England by the Romans. It grows rapidly, and will live as long as an Oak. The timber from old trees is not very durable, but poles grown as coppice are noted for their durability and toughness. They are now extensively used for the hoops of barrels (in preference to Birch, which was formerly used for this purpose), and for hop poles, fencing, etc. The coppice affords good cover for game.

A continuous light fencing is now made from Chestnut coppice. The rods, after being split and pointed, are connected by strong double wires near the top and bottom. The wires are twisted by a simple hand machine that can be used in the shelters in the copse, and hold the stakes at regular distances apart. It is said that the leaf mould from Chestnut trees contains fertilising properties unequalled by any other tree. The value of the timber appears to depend partly upon the situation and the quality of the soil in which the tree is grown, and partly upon its age.

“If cut when not more than fifty years old, it consists almost

exclusively of heart-wood, with a layer of alburnum, or sapwood, equalling in thickness the breadth of the bark ; but when suffered to stand beyond its full growth it is, on good authority, the worst of all timber, being more brittle and more apt to crack and fly into splinters than any other.”*

* Rev. C. A. Johns in “Forest Trees of Britain.”



THE YOUNG TREE
GROWING FROM THE NUT.

THE PEAR TREE.



THE PEAR TREE.

GENERAL REMARKS.



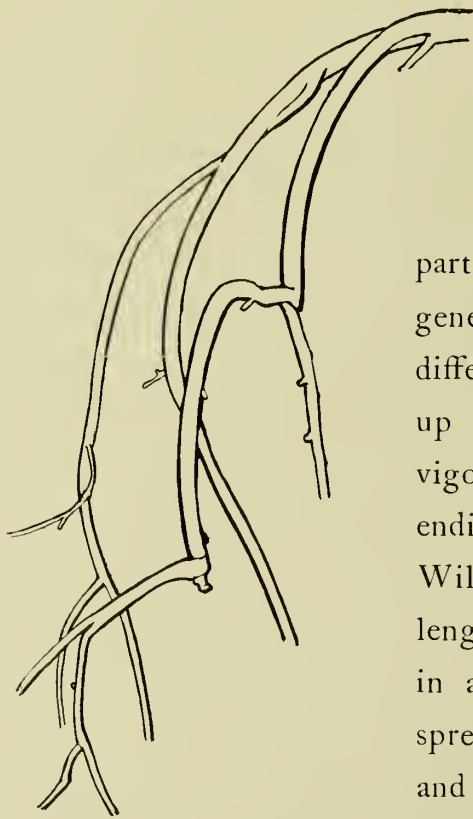
WHEN in winter-time the trees are leafless one may still study with delight the wonderful gradations in size of the woody parts, from the massive bole step by step to the maze of small twigs at the extremities. But the pleasure is not the same in all cases, and the Pear-tree is a particularly unsatisfying instance: It has a trunk which from the size of the lower part seems destined to support a tall tree; but this tapers away suddenly to a mere undignified wisp, that can only suggest a carrot root, or a child's drawing brought hastily to a finish because the page will not contain the magnificent intention of the first design. And there is the same odd inconsistency about the structure of the tree in another respect. The branches near the summit are often upright, while the lower boughs are drooping: they form beautiful patterns in themselves, but are out of harmony with the whole. The leaves are lightly hung on their stalks, and the large bunches of white flowers, so anxiously scanned for their promise of fruit, are an ornament to the garden in their brief season.

GENERAL DESCRIPTION.

In its most usual form the Pear Tree is from twenty to forty feet in height. An upright trunk, sometimes spirally fluted, remains undivided for half the height of the tree, and then separates into several boughs. One of these continues in the same upright direction, tapering off into a point in the manner already described; the others, which are short and stout, soon ramify into a number of long thin

branches, which curve downwards and give off branchlets from the sides and upper surfaces. After division and subdivision, the branchlets hang down almost to the ground.

Those formed on the inner side of the branches (*i.e.*, on the side nearest to the trunk) either curve round the branch to reach the light, or, more commonly, die off, and their traces are only to be seen in after years by a scar or dead stump. In this way, from the outmost point of a branch to the bough with which it is connected, the eye travels along a series of curved steps,

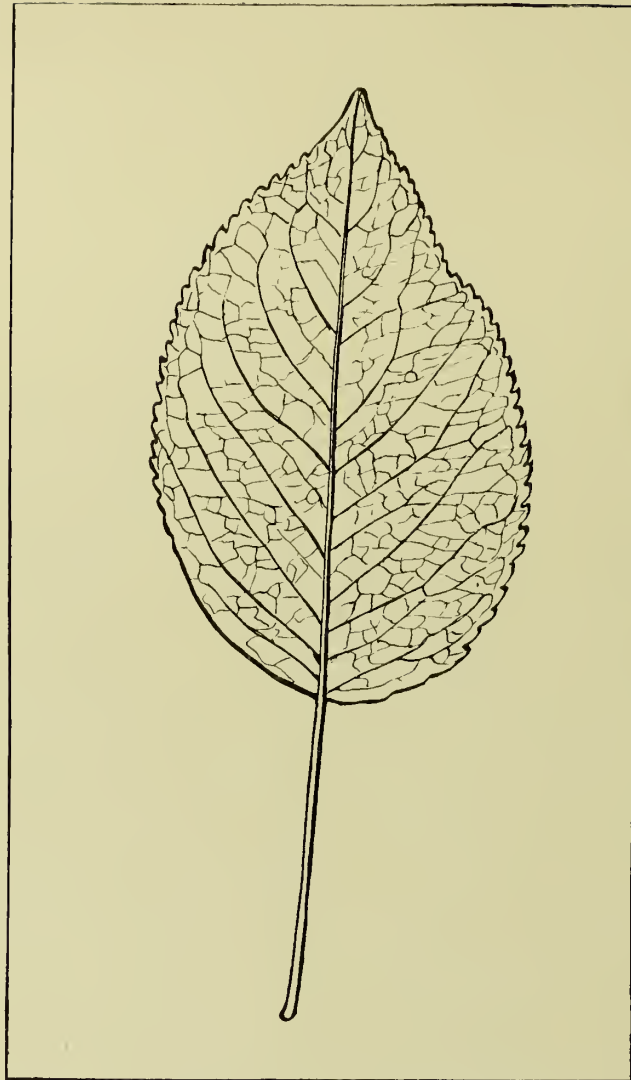


only varied by some lateral growth. The branchlets carry a number of arrested twigs, which also tend to turn towards the light, and which bear a rosette of long-stalked leaves. The branches on the upper part of the tree, though they follow the same general plan of growth, show some minor differences. Some of the branchlets spring up vertically; the new shoots are often vigorous, neither arrested in growth, nor ending in a spine (as is the case with the Wild Pear), but growing to a considerable length and bearing leaves at intervals and not in a crowded rosette. The lower branchlets spread to the greatest distance from the trunk, and the outline of the tree is roughly

pyramidal. The trunk, boughs, and lower branches are covered with a scaly bark, normally purplish-grey in colour though the lichens give it a greener tint. The bark is divided into fairly regular square sections by vertical and horizontal grooves, the former wide, the latter narrower.



PEAR TREE.



PLAN OF PEAR LEAF.

THE LEAVES.

In the Autumn the buds in the axils of the leaves are dark brown and rather long and pointed, and somewhat resemble those of the Black Poplar. Towards the end of April, when the flower buds are bursting, the young leaves form a rim round the flower-head. The leaves look like upright scrolls, for the two edges of the blade are rolled in separately towards the central rib. Only the under side

is seen; it is of the palest green and coated with wool that is nearly white. As the leaves unroll, the more brilliant green of the silky upper surface is seen. The fully developed leaf has a pale greenish-yellow stalk nearly as long as itself. The leaf-blade is hardly at all puckered, and the two halves either lie quite flat or form a wide V with the mid-rib in the centre. Except on vigorous upright shoots, when they point upwards, the leaves usually droop. The glossy upper surface of the young foliage becomes dulled as the year goes on, the underside keeping its paler green. The mid-rib which bisects the dark blade is light green, but the smaller veins which cover the under-side with an intricate pattern are dark-coloured, though they show up paler when the sun shines through the leaf. The leaves are arranged singly on the shoot, but the shoot is often so much dwarfed that they appear to radiate from a circle round the bud. A pair of stipules at the base of each leaf have usually withered before the flowers are set. Pear Tree leaves are about two or three inches long, slightly serrated and sharply pointed.

THE FLOWER AND FRUIT.

The flower-head lies in the cup of scroll-like leaves, supported by a short downy main-stalk of pale-green. From different points



on the main-stalk spring other thinner stalks, each bearing a floret. The central stalk of these secondary ones continues the direction of the main-stalk, and is the longest, so that the group of florets has a hemispherical outline. Before the florets expand, the petals form a white ball, set round with pointed sepals, and below these is the swollen calyx tube. The expanded floret shows five pure white petals, and is



THE YOUNG LEAVES
AND FLOWER BUDS.



THE FRUIT IN
AN EARLY STAGE.

saucer-shaped. Between the tapering bases of the petals, which are widely separated, the pale green sepals are seen. The centre of the floret looks a very pale green, for both pistil and stamens are usually that colour, though the stamens are sometimes white. The crimson pollen sacs at the tips of the stamens make dark spots against the white petals. The pistil has usually three styles.

The transition from flower to fruit is easily seen in the Pear. In the early stages the sepals which project beyond the young fruit are very noticeable. The relative position of the parts of a flower and the subsequent formation of the fruit is a most interesting study, but does not fall within the scope of this book. In the blossom of the Pear, the ovary is

inside the calyx-tube. The White Beam, Apple, Rowan, and Medlar trees afford examples in which the ovary is found below the point at which the petals are inserted ; in the Cherry, the Plum, and the Holly the ovary is above the petals. A curious point may be noticed in the flowers of some trees, where, although a single floret may contain both male and female organs, the latter are developed first, and consequently cross-fertilisation between one tree and another must take place before fruit can be produced. It is said that the flowers of a Pear tree are in a marked degree insusceptible to the pollen of its stamens, and rely upon the good services of insects in bringing to them the pollen of other trees for their fertilisation. The fruit of the cultivated species varies in size, texture, and colour ; that of the wild is from one to two inches long, and yellow when ripe. On both wild and cultivated trees the lower and heavier portion of the fruit swells out into a bulbous shape. The fruit, pendent from its weight, is supported singly on a stout rough stalk.

THE PEAR TREE (*Pyrus Communis*).

The Pear tree is not common in the wild state. It bears spines which are not found on the cultivated tree, is smaller in size and has rougher leaves and small inedible fruit. Authorities are disagreed as to whether or not it is a native of England. In the garden the tree reaches an average height of thirty feet ; like the Apple it is sometimes grown on an espalier, and makes a picturesque feature of the kitchen garden. Wild Pear trees live to a considerable age, and some in cultivation are said to have existed for five hundred years. The fruit is used for perry and for preserving, as well as in its fresh state. The wood is hard, heavy, and rather close-grained.



THE FRUIT.



FALLEN SPRUCE.

THE SPRUCE.

GENERAL REMARKS.



THE Spruce is, as one might say, the sentinel among trees. It is set as a protecting belt round the covers near at hand, and holds the boundary between the paddocks and the "wilderness," which an oak paling shuts off from the outer world. In the paddocks there are ornamental firs, grouped in rings, and iron railings, all neat and dull. But past the spruces, in their trim decorum, beauty has stepped out into the wilderness. There the hand of cultivation has done its work and then successfully effaced itself. Rhododendrons in a gay profusion are reflected in the ponds, well stocked with fish. Stately swans and the humble moorhen, sometimes even a timid wild duck, nest undisturbed amongst flowering Rushes, Willow-herb and the exotic Bamboo. There are Barberries, Laurel, the Snowball Tree and the pink Hawthorn, growing side by side and blossoming each in their season, while double Daffodils and the sweet Jonquils make a home in the grass.

SPRUCE FIRS.

There are twenty-five varieties of the Common Spruce. Many of them bear a resemblance to the Hemlocks Firs, but there are clear points of difference between the species. The leaves of the Spruce are angular ; they usually spring from all sides of the twig,

and point in every direction, except when on the lower boughs they all lie horizontally. On the Hemlock Firs the leaves are flattened and arranged in two rows, and all take a horizontal position.

The cones offer another mark of distinction. Spruce cones are six inches long, those of the Hemlock Firs only an inch long. Both are pendent, and the Spruces can be distinguished by this mark from the Silver Fir, which has its cones standing upright on the twigs.

The leaves on the latter tree, unlike the Spruce, are usually arranged in two rows, and they have also two silvery lines on the under-side, while the tree, in its old age, has a flat top very different from the spires of the Spruces. It has already been pointed out (in the description of the Scots Pine) that the leaves of the Firs can be distinguished from those of the Pines by the way in which the former spring singly from the twig, while the latter grow two or more from the same point and are held together by a sheath at the base. The Spruce reaches a height of seventy to over one hundred feet, and has a cylindrical trunk covered with thin, scaly, red-brown bark. The branches are slight and short in comparison with the trunk. Trees which stand alone retain their lower branches; in plantations these die off, though they remain in their places often for years. It is these numerous thin dead branches which give the effect of mist to anyone standing inside a Spruce plantation. The Spruce shares with other evergreens a certain prominence when deciduous trees have lost their foliage, and in the Spring shows a contrast of pale bright green young shoots with sombre elder leaves.

THE BRANCHES.

A wonderful regularity of outline is noticeable in a Spruce standing by itself. Whorls of branches spring from the vertical

tapering trunk which ends in a bare spire ; the lower ones are drooping with re-curved ends ; the upper ones lie, each in succession, rather more level till a point is reached, towards the summit of the tree, when they begin to incline slightly upwards.

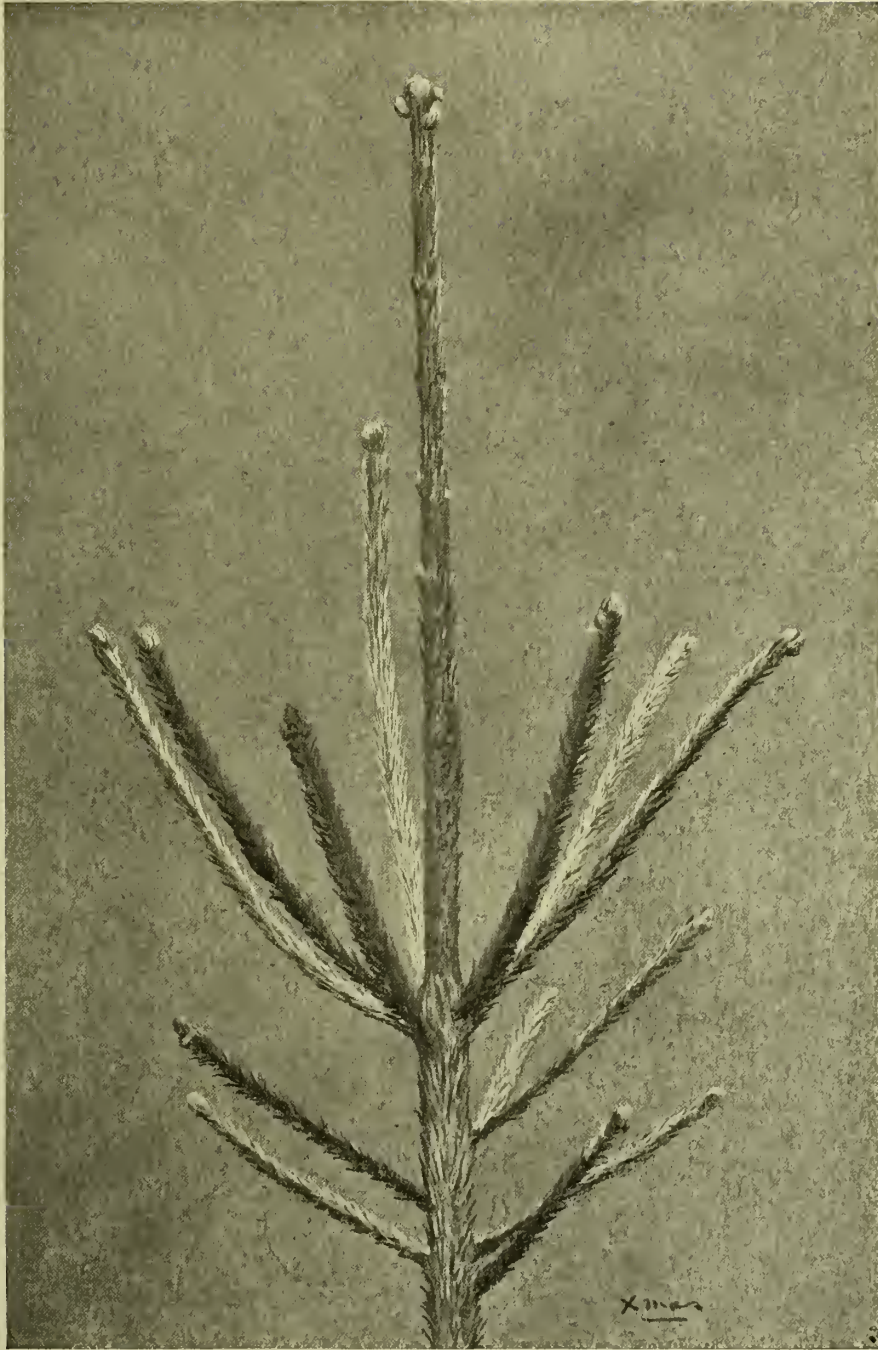
To correspond with this gradual change of position there is a regular diminution in the length of the branches from the base to crown of the tree. Each branch is in its degree moulded on the same plan, except that the branchlets carried near its base are killed off by the dense overshadowing foliage above. The surviving twigs spring from all sides of the parent branch, bend downwards and curve up again at the tip. In each lesser ramification there is the same precise regularity. The double curve, repeated on every tier of branches, repeated again, many times, from whatever point our observations are made (whether directly to the front or to the side of us ; at the level of the eye or above it), is yet never monotonous ; it is a study in perspective of infinite variety. The arrangement of the branches greater and less might be compared with the fronds of a bracken fern, though the comparison is less forcible in the case of a Spruce than it is with some other coniferous trees, where all the branches are produced laterally and lie horizontally. Where the trees are crowded together, or when they are old, the formal growth almost entirely disappears. The branches become less regular, and through the gaps left between them the outline of the trunk can be traced from top to bottom. The sparse foliage and the shorter scattered twigs lie more stiffly and horizontally, and the heavy droop of the free-grown branches, which have a curve like the young moon, is lost.

THE LEAVES.

Last year's twig is a light yellow colour, and thickly covered with spiral rows of dusky green needles. In May two or three new shoots spring from just below the tip and form a cup, in the centre of which the terminal shoot, also new-grown, carries on the line of the parent twig. These new shoots are covered with soft waxen pale-green leaves, which all point towards the apex, where sometimes the brown skin-like covering of the bud still form a little cap.



The new shoots soon bend down, and the leaves at the base which were first formed curve backwards and begin to be spaced apart on the lengthening shoot. Other young shoots are produced singly from the old wood, but these for the most part die off and hardly interfere with the regular whorls of shoots and succeeding branches. Each branch and twig has its similar cluster of new shoots, the only variation being in the more horizontal position of those on the lateral branches as compared with those on the branches near the apex of the tree. The needle-like leaves become dark green as the year advances; they remain on the tree for six years, and the branches as well as the new shoots are thickly covered with them, though the normal growth of the wood carries them in time further apart. At the junction of the leaf with the twig there is a raised cushion which remains on the branches after the leaves have fallen. The leaves when mature are stiff and sharply pointed, and instead of being round or flat have four sides. Their average length is three quarters



SPIRE OF A
YOUNG SPRUCE.



OPENING BUDS.

of an inch, and they are arranged singly on all sides of the twig and form spiral rows.

THE FLOWERS AND CONES.

The male and female flowers are produced on the same tree. The *Male Flowers* appear about the end of April or early in May, and they grow out singly from last year's twigs. They are about one to two inches in length, and coloured a pale fresh brown with pink tips. At first they are partially covered with shining skin-like bud scales; these stick together, and later on become detached in masses. When the flower-cone is fully ripe it is covered with bright yellow pollen. Usually there are three to six male flowers on a twig. In construction the flowers resemble those of the Scotch Fir and Larch,

and are made up of a central axis (hanging or upright) which supports a number of small overlapping scales pointing towards the tip. Each scale has on its underside a pair of anther lobes.



The *Female Cones* spring from the end of last year's shoot. At the beginning of June they are about three inches long, beautifully coloured with tints of mauve, green, and rose pink. Their construction is very like that of the male catkin—a central axis supports their loosely-arranged scales, which are soft and waxy in texture, and set in spiral order overlapping one another. On the upper surface of each scale and at its base are two “inverted” ovules. The seeds take two years to ripen, and are then carried away by the wind on the transparent wing attached to each. Before this the cone has become pendent from its weight, and the scales stiff (not woody) and of a light yellow-brown colour. After the seeds are dispersed the cone drops off entire. The cones of the Silver Fir drop to pieces instead of falling whole. Lord Avebury, in “British



THE FEMALE CATKINS.



Jan 1. 1900

SPRUCE CONES.
(Drawing reduced by one-third.)

Flowering Plants," states that the cones contain from three hundred to three hundred and fifty seeds. The mature cone is five or six inches long by one to two inches in diameter, and tapers to a blunt point. The illustration given below shows the embossed pattern on the cone of a Scots Pine. This should be compared with the smooth scales of the Spruce cone.



THE SPRUCE (*Picea excelsa*).

The Spruce is not a native of Britain. The earliest record of it in this country belongs to the sixteenth century. It grows best on high land when partly protected from wind. Summer drought and winter snows injure the tree, and it is often uprooted by high winds. Spruces grown together partly protect one another by the interlacing of their roots. The young shoots are often destroyed by squirrels, and the bark by rabbits. The Spruce gall, which resembles a small cone, is the work of an aphid which deposits its eggs in the buds, and the tree is subject to injury by many kinds of insects. The timber—the red and white “deal” of commerce—is valuable for nearly all purposes and imported chiefly from Norway. Young trees, which have grown too rapidly from over-much exposure to the light, produce soft timber. The straightness of the trunks and their freedom from branches when grown closely together make them indispensable for scaffold-poles, ladders, and masts. The wood is light and pliable, and vies with that of the Silver Fir for durability.

BLACK POPLAR.



LEAF ARRANGEMENT
OF BLACK POPLAR.

BLACK POPLAR.

GENERAL REMARKS.



IN most trees the leaves are massed together into groups. On the Oak the groups are arranged in tufts, on the Beech in layers; Ash-foliage makes lace-like patterns. Clear-cut patches of sky are visible between the masses of foliage on the Elm: on the Horse Chestnut the layers are so dense as to be impenetrable to the light. Sometimes the whole tree is a mere leaf-tracery against a background of sky, which peers in through countless apertures: the Birch is a notable example. On the Sycamore the foliage groups have sharply defined edges: on the Willow the edges are blurred. But on all these trees alike, the impression made by the individual leaf is lost in the general effect of a mass of foliage.

On the Black Poplar each separate leaf stands out and draws attention to itself as a distinct object: each leaf holds its own in the foliage picture. This is accounted for by the size of the leaves and the unusually wide distances between them, and also by the unbroken leaf-margin, so different from that of the Mountain Ash. The blade has neither a very light underside like the White-beam, nor a very reflective upper surface like the Holly, to blend it with the sky. And—foremost reason of all—the leaves hang vertically, so that many of them show their whole outline, and this in spite of the inevitable overlapping of branches, foreshortening, and

the blurring effect of constant motion. The impression still remains that the leaves of the Black Poplar look like so many separate dots against the sky.

A noble simplicity and restraint is the character of the tree in all its parts. It has large, well-spaced buds, and heart-shaped leaves, neither lobed nor divided, and standing well away from the twig on long petioles. The branches ramify with unfailing regularity of system. The boughs form long, sweeping curves from point to base: the twigs do not hide them, and they stand out distinctly from their branches, and spring from a stem marked with equal distinctness. The tree is so consistent in its lack of intricacy that it is for this reason as attractive as the Hawthorn is for its mazy network of branches and multiplicity of forms.



BLACK POPLAR.

SPECIES OF POPLARS.

GENERAL DESCRIPTION.

HERE are three distinct species of Poplar, namely, the Black Poplar (*Populus Nigra*), the White Poplar (*Populus Alba*), and the Aspen (*Populus Tremula*). In addition to these there are four varieties, namely, the Lombardy Poplar (*Populus Fastigiata*), the Balsam Poplar (*Populus Balsamifera*), the Black Italian Poplar (*Populus Monilifera*), and the Grey Poplar (*Populus Canescens*). Of these, the Lombardy Poplar is a variety of the Black Poplar, which it resembles closely in the construction of buds, leaves, and catkins, though its branch formation is entirely different, and the tapering column of its outline bears no likeness to the full-spreading shape of the other tree.

The Balsam Poplar is also a variety of the Black Poplar. The stronger scent of its young leaves and buds, and the generally stiff character of the tree, are its chief points of distinction.

The Black Italian Poplar is yet another variety of the same species; it has a less spreading form, and an even more rapid habit of growth.

The Grey Poplar is either a variety of the White, or a cross between it and the Aspen: in its general construction it resembles both trees.

All these species of Poplar, and their varieties, have certain characteristics in common: they bear their leaves on long more or less flattened stalks, which are set at right angles to the plane of the leaf-blade. The individual tree bears either male or female catkins, but not both, and the catkins are very much like those of the Willow in construction. All the Poplars grow with extreme rapidity.

There is great variety in the details of form amongst the different species and their variants, as well as between individual trees, and some notes may be helpful in identifying them.

THE TRUNK.

The Black and the Black Italian Poplars, and the Aspen, have the trunk clearly marked throughout the height of the tree. In the Lombardy Poplar it forms a single vertical column, and is fluted in a distinctive manner: the Grey, White, and Balsam Poplars usually have their trunks less clearly distinguishable from the upper branches.

THE BARK.

Bark of the roughest texture and the darkest colour is found on the Black Poplar. The Aspen and the White and Grey Poplars have pale - coloured bark, which is smooth except at the extreme base of the trunk, or only slightly cut.

BUDS.

The buds of the Black, the Balsam, and the Italian Poplars are large, shiny, and sticky with gum. The buds of the Lombardy Poplar only differ in being smaller; those of the Grey and White Poplars are neither sticky nor shining, but coated with white down: those of the Aspen again differ completely in being very small and smooth.

NEW SHOOTS AND YOUNG LEAVES.

The young leaves of the Black Poplar and its varieties are smooth and shining, with a somewhat silky under-side, usually sticky, and, especially in the case of the Balsam Poplar, sweet-scented. The young leaves of the Aspen are downy, and the young shoot is sometimes hairy, sometimes smooth.

On the Grey and White Poplars both the young leaves and the new shoots are thickly coated with white down, which on the upper surface gradually disappear as the leaf grows older.

MATURE LEAVES.

The form of the leaves is subject to great variation, not only between the species and between the individual trees of a species, but in the foliage of a single tree. Those of the Aspen most nearly approach a circle, with large widely-spaced teeth, and have the longest and the most flattened footstalks. The leaf of the Grey Poplar resembles them in form, but the outline is less regular, and the leaves springing from the suckers are cut up by two pointed lobes, which give them a likeness to those of the White Poplar. The leaves of the Black Poplar vary from heart-shaped to triangular. On the Lombardy Poplar they are smaller; on the Balsam Poplar, which has the least flexible foot-stalk of any variety, they are larger and inclining to egg-shaped. Both surfaces of the leaf-blade in the Black Poplar and its varieties are smooth and remarkably alike. The White Poplar is distinguished by a dense white wool covering its under-side, the Grey by one less dense which is lost before the autumn. Both surfaces of the Aspen are usually smooth: sometimes the under surface is silky; the upper surface is either glossy or dull.

THE CATKINS.

The Catkins agree in having hairy bracts which sub-tend the scales. The stamens of the male flowers vary in number; the Aspen and White Poplar have from four to ten, the Balsam from twenty to thirty, the Black and the Lombardy from twelve to twenty. The female catkins of the White Poplar carry two stigmas with divided tips. The Black Poplar has four stigmas, the Grey four also, with their tips sub-divided into four. There appear to be no female catkins on the Lombardy Poplars, as only male trees were imported. The stigmas of the Aspen are branched at their tips. Differences also appear in the scales of the catkins: on the Aspen they are lobed and notched, on the White Poplar notched, on the Grey deeply cut.



HAY-TIME BY THE POPLARS.

BLACK POPLAR.

RAMIFICATION.

In autumn the shoot formed during the past summer is a reddish-brown colour. The terminal bud is conical and sharply pointed, and the bud-scales which enwrap it are not moulded to its rounded shape, but project, giving it an angular appearance. The lateral buds are smaller, and are set with their tips inclining towards the shoot. Their colour is a dark purple-brown, and they are covered with a sticky, sweet-scented gum.

The ordering of the buds on the Poplar is in spirals of five round the stem: in every spiral the corresponding buds are found in line, one beneath the other.

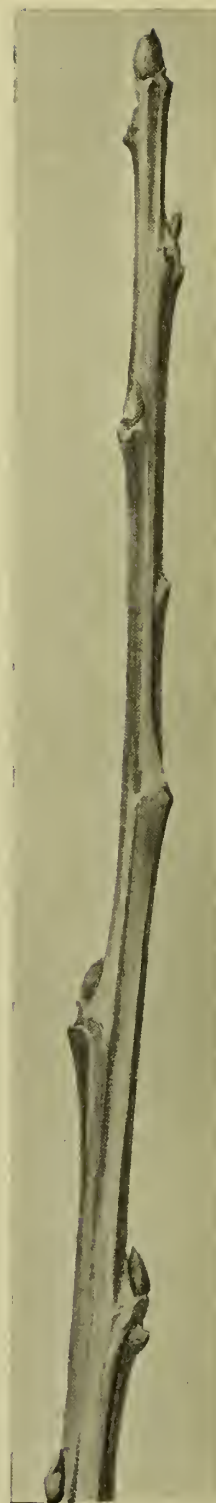
The formation of the terminal twig is unusual and interesting. It represents a miniature pinnacle, studded with buds throughout its whole length, in the manner already described. The buds rest on



TRUNK OF A
YOUNG POPLAR.

the bases of last year's leaf-petioles, which—to carry on an architectural simile—project like crockets from the pinnacle. From either side of the crocket a deep groove starts, and is continued downwards for some distance, so that the twig, instead of being rounded like the twig of a Beech, or flattened like an Ash-twig, is deeply fluted. But owing to the spiral arrangement of the buds, the flutings do not make continuous lines, but are broken off abruptly.

Below the section of last season's growth, and in a line with it (for the Poplars have true terminal buds), is the twig of two seasons back. It is now about six inches long, and knotted throughout its whole length by the projecting petiole-bases. This portion is coloured a pale brownish yellow, and looks just as if it had been varnished. At its junction with the wood formed in still earlier seasons, it bears only a small side-branch; in comparison with the continuous lengthening of the twig through the terminal buds, the growths of the lateral buds are of very little account. The older wood is a dull dingy brown, and the projections still remain, and form a kind of circlet at the junction of branch and stem. In the Spring the young shoot becomes lighter in colour, losing its red-brown tint, and the buds stand away from it and increase to an inch in length. The tip of one bud just reaches to the base of the next. The buds are very conspicuous, both on account of their size and pyramidal form, and by comparison with the bareness



of the twig beneath them. Many of the lateral buds contain flowers only, and this accounts for the paucity of side-branches, and for the long uninterrupted lines which result from the growth being carried on mainly from the apex of the branch.

The young branch starts from the older bough at an angle that varies from 60 to 90 degrees, and then makes a clear sweep away from it. But since the branch continues to grow from a terminal bud, and the new portion is in a straight line with the old, the leaves might be expected to hang down like a fringe from their horizontal support, and overlap one another. But the twig in its first stage assumes a position just so much tilted as to obviate this, and, as a further result, a curve is gradually produced in the branches. These long sweeping lines, clearly seen from end to end, make the tree easy to recognise among the many other varieties, which throw out shoots in every direction, and show no continuity of line.

The lower branchlets are often inclined downwards, and here and there a horizontal one will be found. An unusual feature of ramification is the habit which the Black Poplar has of producing wispy twigs from the underside of its branches. These grow straight down, instead of curving upwards round the branches or lying horizontally, as is the case with the Sycamore and many other trees.

THE CATKIN.

Among the Poplars some individual trees produce male flowers only, others only female flowers. The flower-arrangement of the Alder, the Hazel, and the Holly should be compared with this.

The Male Catkins at the end of March, before the leaves appear, burst from the sticky brown scales that protected the bud during the winter. Inside these scales are longer ones, which are

also gummy and of a greenish-yellow colour. The young catkins are at first erect, bullet-shaped, and about an inch in length. The stamens, packed closely together, are hidden under a downy white covering. As the catkins lengthen they curve over, and the bright crimson colour of the anthers is seen, for the down has become relatively unimportant, and the florets are set well apart from one another on the central pedicel of pale yellow which supports them.

Each floret grows on a short foot-stalk, and springs from the main pedicel. In its next stage the catkin becomes pendent, and grows to a length of three to four inches; next the pollen-sacs open, and a yellow pollen-dust covers the catkin, over which it is scattered. The brown cases, empty but for some traces of pollen still adhering to them, make the catkin look very soft and give it a yellow tinge.

From two to five catkins hang on a twig, at some distance apart, the uppermost one being found just below the terminal leaf-bud.

The Female Catkin. The seed-vessels are arranged spirally at regular intervals along a central support, which, like themselves, is of a bright yellowish-green, and to which each vessel is attached by a tiny green stalk. The seed-vessels are egg-shaped, and end above in two-lobed stigmas; each one is marked off into four sections by indented lines drawn from tip to base, and is provided with a fleshy covering; subtending each seed-vessel is a hairy bract.

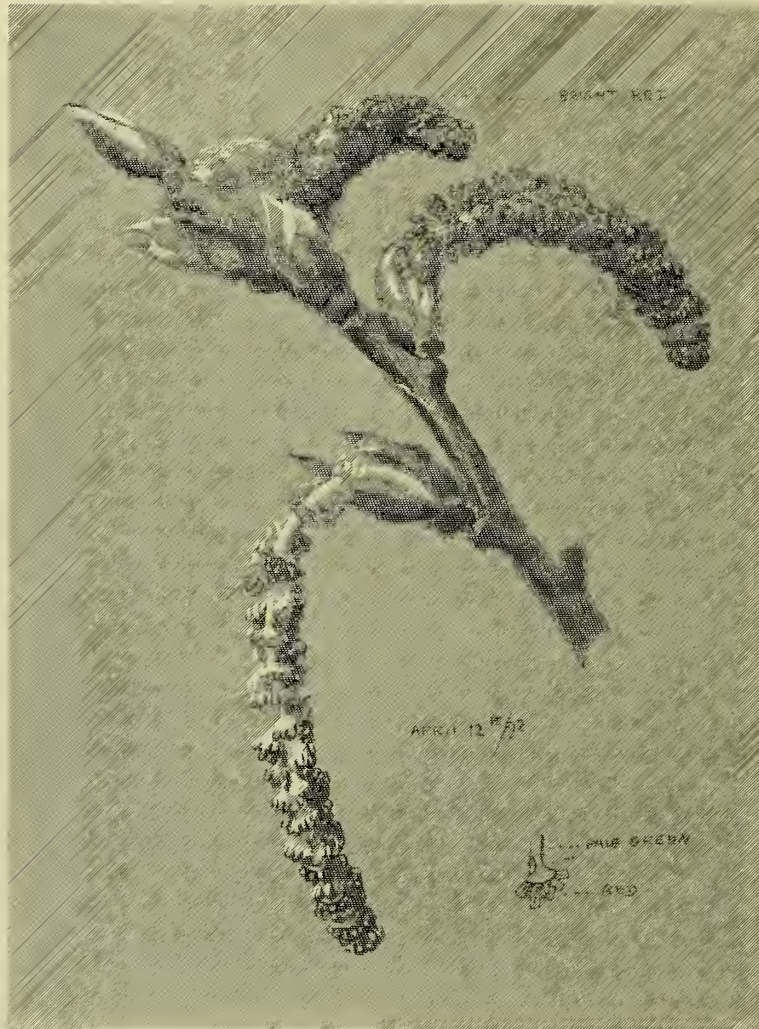
When the seeds are ripe, the ovary splits open by means of two valves, and the seeds, each of which has now developed a hairy appendage, burst out and form a white downy mass.

THE LEAVES.

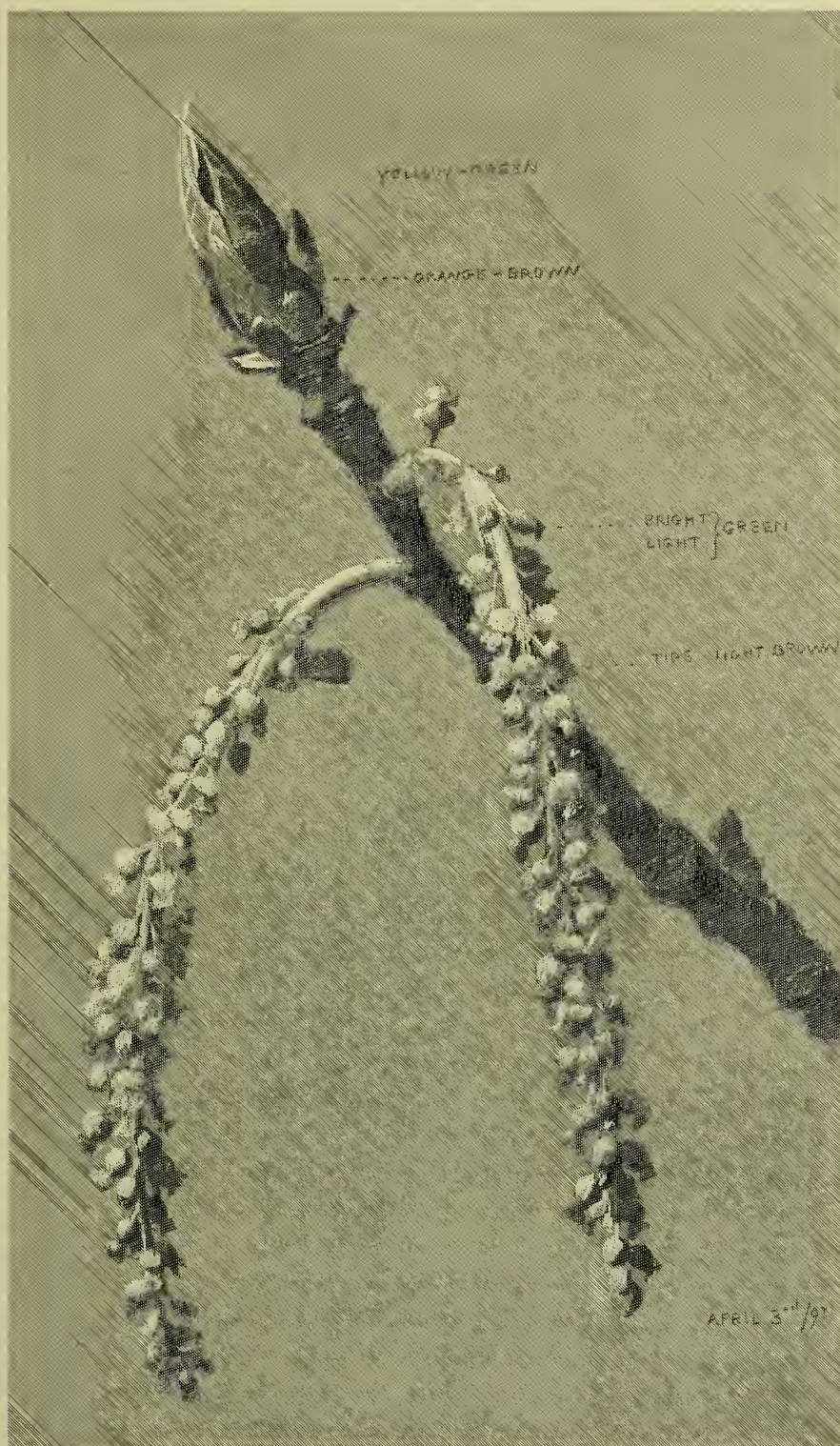
The sweet-scented young leaves, clinging closely together, gradually push apart the gummy stipules, and emerge at the tip of the bud.



BRANCH WITH YOUNG CATKINS.
(Drawing reduced by one half.)



MALE CATKINS OF
THE BLACK POPLAR.



FEMALE CATKINS
(Var; Balsamifera).



OPENING
LEAF BUDS.



THE YOUNG LEAVES
(Var: Balsamifera).



THE LEAVES FURTHER DEVELOPED.
(Var: Balsamifera.)

Only the shining reverse of the leaf-blade can be seen, for each leaf is rolled inwards from the outer margin, and the earliest leaves enclose those which are destined to a later development.

As the leaves expand they at first stand upright, and show the glossy bright yellow (or, in some varieties, the shining red) of the upper surface, and a paler under surface, glossy also, coated with hairs along the midrib and at the edge. When fully developed the leaf is peculiar from having both sides nearly alike. The footstalks are pale yellow, stout and hairy; they are flattened in such a way that the leaves, which hang vertically from them, quiver with the slightest movement of the air. The leaves which are the last to unfold have the edges slightly serrated.

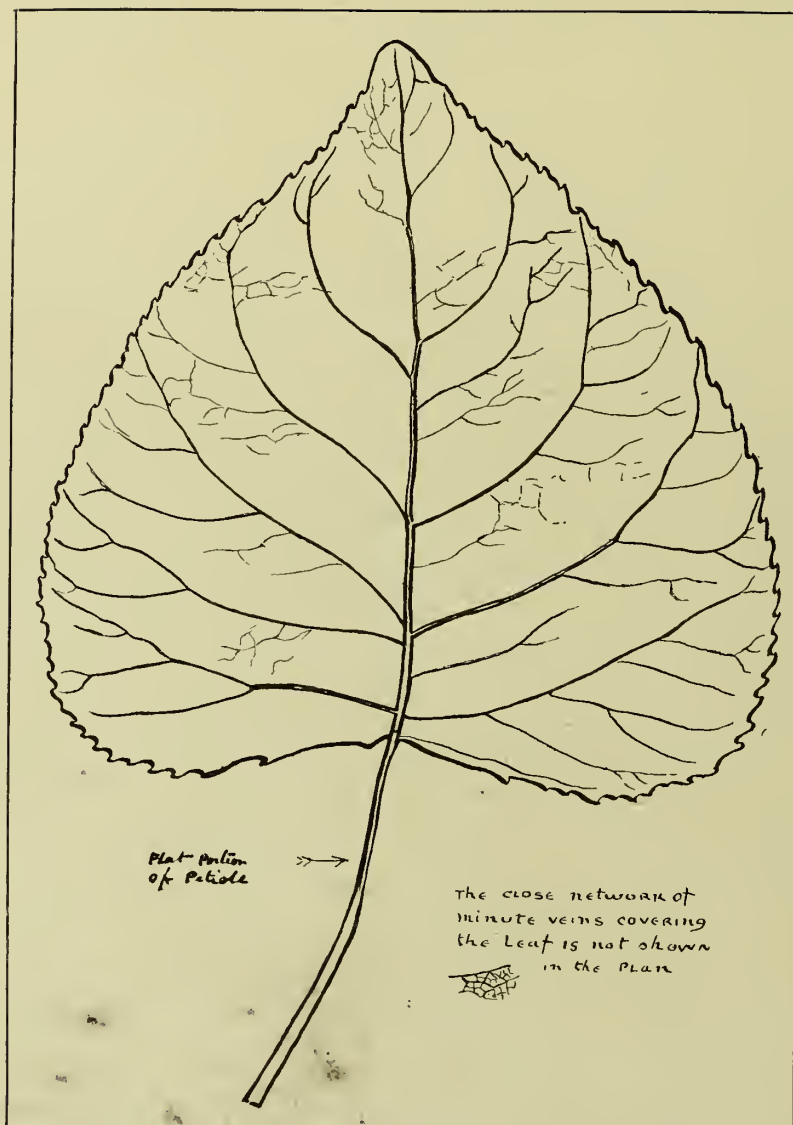
As summer passes on, the foliage changes its gloss for a dull, uniform green, and in autumn is tinted with gold.

THE BARK.

The trunk of an old tree is marked with large excrescences, and bears tufts of adventitious branchlets. It is covered with a dark grey-coloured bark, deeply scored with irregular vertical cuts. The projecting ribs of bark between the cuts are rough and transversely notched.

THE BLACK POPLAR (*Populus nigra*).

Poplars grow very rapidly, and in plantations will sometimes reach a height of 50 feet in twenty years; they flourish best near water, and are undaunted by a poor soil. The Poplar is considered to be a naturalised tree, though it is not known when it was first imported. The timber is soft, and of little value for general purposes.



PLAN OF LEAF
BLACK POPLAR.

LOMBARDY POPLAR.



LOMBARDY
POPLARS.



THE BOLE.

LOMBARDY POPLAR.

GENERAL REMARKS.



THE Lombardy Poplar, like the spire of the village church, is the landmark of the country side. Its slender taper rises from the level lake of the morning mist to catch the flame of sunrise long before the vapourous curtains are rolled away, and the village itself, in which the tree stands, comes to view. Throughout the day its sensitive leaves reflect the moods of the hour; they glitter in the sunlight, they dance to the breezes, or are ruffled by sudden gusts; through the sultry hours of

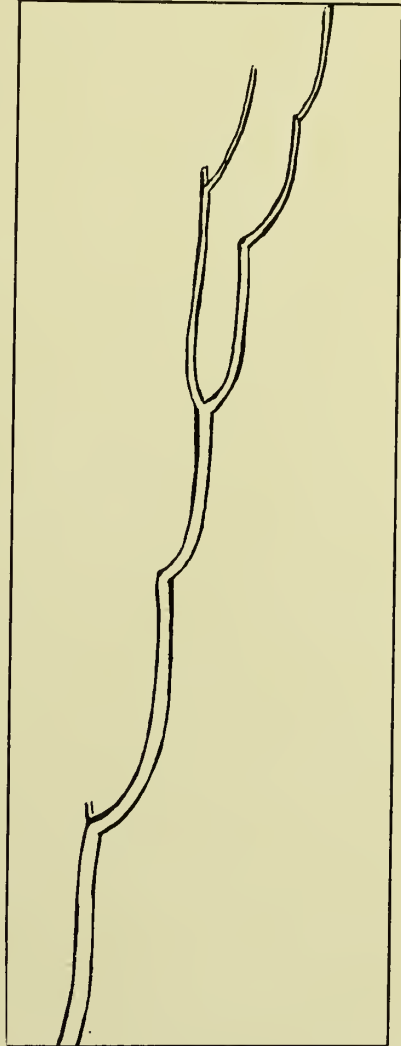
midday they hang motionless, while lurid clouds gather up against the wind.

Then, with the rush of the storm, the slender stem is bowed, and the branches to windward strain against its side, so that stem and boughs together offer a simple curve to the onslaughts of the tempest; the ragged starting foliage is blown out to leeward and the upturned leaves show almost white against the red lights and blue-black shadows of the thunder-cloud. And as for the lights and shadows of the passing hours so for the seasons, the Poplar leaf has its response; red is its colour for the spring, in summer a refreshing green; in autumn the tree has a crown of gold.

RAMIFICATION.

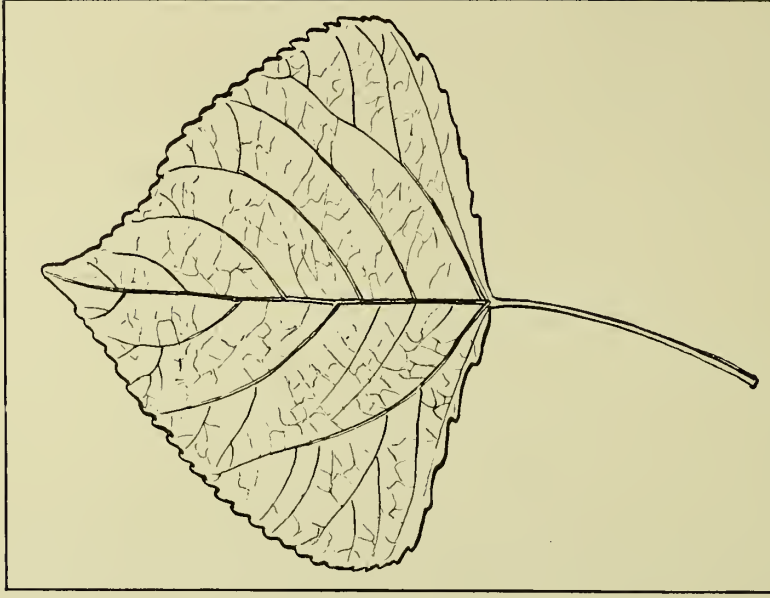
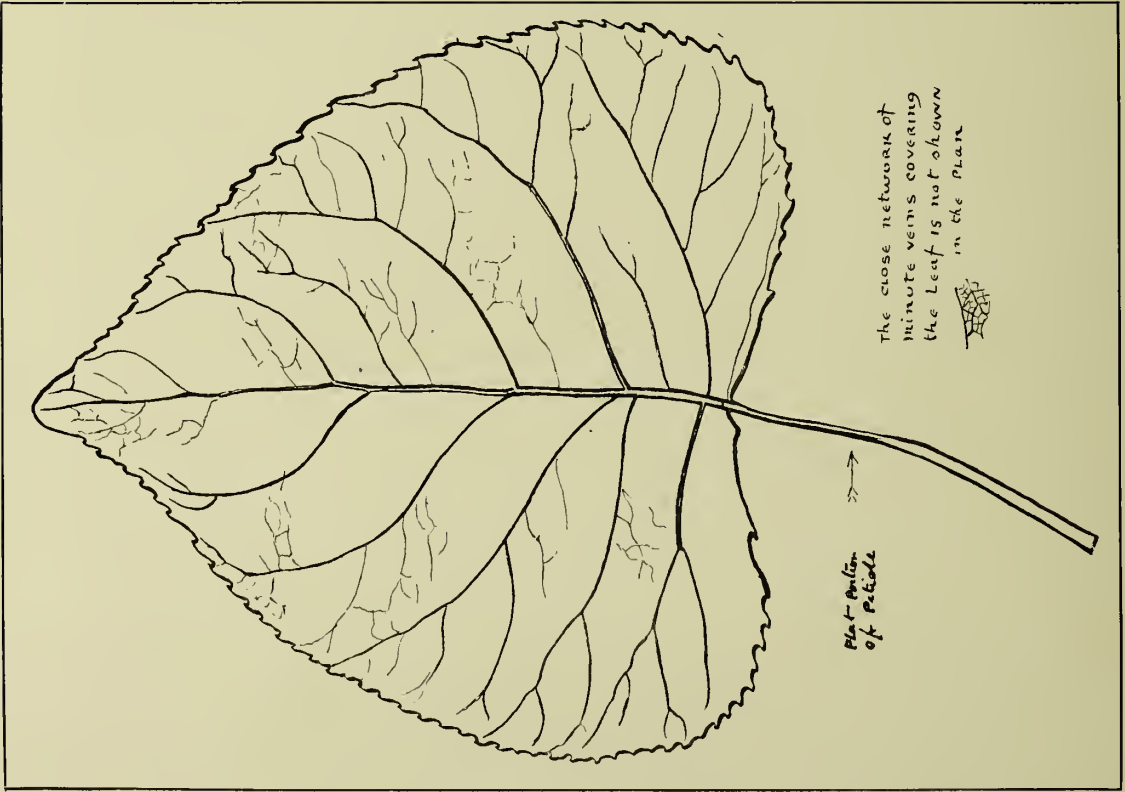
The arrangement of bud and leaf is modelled on a similar plan to that of the Black Poplar, of which the Lombardy Poplar is a variety. The striking difference in the general form of the two trees is caused by their habits of growth, and not by a different plan of construction. Both trees have active terminal and lateral buds, which produce new shoots; there is no dissimilarity in the position of the buds, nor any constant unproductiveness in either species (such as we have observed in many other cases), to account for this difference of form. A branch of Black Poplar continues its growth from the terminal bud and from the lateral buds on every side, the former outstripping the latter. The branches as a rule tend outwards and upwards; some which lie horizontally produce hanging twigs. On the Lombardy Poplar terminal and lateral shoots are also formed, but they all tend upwards. The shoots which spring from the inner side commonly die for want of space, for they are crowded between branch and trunk. Even the terminal shoot soon becomes

cramped for room by the lateral branches which form outside it, and so dies. Thus the upward growth of the branches is carried on by a succession of shoots developed from buds on the outer side, and the resultant bough is made up of a series of curves following one above the other, with here and there an incurving twig springing from it. The main trunk itself is often ousted by a couple of lateral boughs which continue their upward growth in parallel or but slightly diverging lines. These usurpers, or the shoots they support, will reach a height of no less than 150 feet. The lower trunk is often deeply fluted with vertical or spiral indentations, and the bark which covers it is divided by diagonal incisions. The numerous weak branchlets often conceal the outline of the branches, and by their want of expansion necessitate the crowding together of the leaves. Each main bough, with its dependent branches and foliage, forms a column set at an acute angle to the central trunk, and between these parallel columns strips of sky are visible. A well-grown tree takes the form of a tapering column with a pointed base.



THE FLOWER.

Both the leaf and the male catkin of this tree resemble those of the Black Poplar, though they are of smaller size. No tree bearing female catkins has come under the writer's observation.



LOMBARDY
POPLAR.

PLAN OF THE LEAVES OF BLACK POPLAR
AND LOMBARDY POPLAR SHOWN TOGETHER
FOR COMPARISON.



YOUNG LEAVES

—AND HOW THEY EXPAND.



THE LEAVES
FURTHER DEVELOPED.

THE LEAF.

The leaf is smaller than that of the Black Poplar. It resembles it in form, though its base is often contained by a straight line. This gives the leaf a triangular shape more pronounced than in the leaf of the Black species, where the base is contained by curved lines. Both sides of the leaf have a smooth surface, and though the upper one is darker and less dull than the lower, there is a marked resemblance between them. The young leaves are rolled and stand upright, and their colour is a pale greenish-yellow or red. The mature leaves hang or lie horizontally on the slender stalks characteristic of the species.

THE WHITE POPLAR,

OR ABELE (*Populus Alba*).



As a young tree the White Poplar bears some resemblance to the Black Poplar. The trunk, however, has not the same unbroken line, and in the fully-grown tree the predominance of the main boughs over the smaller branches (so characteristic a feature of the Black Poplar at every stage) becomes less marked; they sub-divide more frequently, and gradually dissipate their superior size amongst many tributaries. Another distinguishing feature is the colour of the bark. The Black Poplar has rough dark bark; the other a smooth pale-grey bark, pitted with lozenge-shaped marks, which are divided vertically by a slight red-brown incision. These marks are grouped in patches and horizontal rows, and form rings, which accentuate the roundness of the trunk. At the lower part of the bole the diamond-shaped marks disappear, the incisions become deeper, and the bark forms vertical cork-like ribs between them. The upper part of the trunk and the branches retain their smooth surface. The tree is of very rapid growth, and attains a height of seventy to one hundred feet. The timber, like that of the Aspen, is white, soft and light, and does not burn easily. Like the Aspen also, the roots are given to sending up suckers for a considerable area round the trunk. Botanists are undecided whether the tree is indigenous, or imported from Holland.

THE LEAVES.

The opening buds are downy, and of a pinkish-white colour. The new shoots have a tinge of purple, and, like the young leaves, are at first thickly coated with white down, a covering which is retained on the upper surface for a month or so: on the under-side it remains on to maturity, and its whiteness contrasts with the dark



WHITE POPLAR

green upper surface of the leaf, which becomes thick, opaque, and somewhat leathery.

Late in the season both sides of the blade are sometimes smooth. The leaves of this tree are subject to great variation in shape, but they are usually more pointed and more triangular than the leaves of the Aspen or the Grey Poplar. The margin is generally cut into by sharp toothed lobes: sometimes it is merely jagged or slightly toothed. The leaves of the suckers have conspicuous lobes, and are larger than the others, measuring as much as four inches against their two to three inches. The leaf-surfaces are not so flat and even as those of Aspen leaves, and they hang less loosely than either these or Black Poplar leaves. The leaf-stalks are flattened like those of other Poplars, but are not so long in proportion to the leaf as on the Aspen.



PLAN OF LEAF.

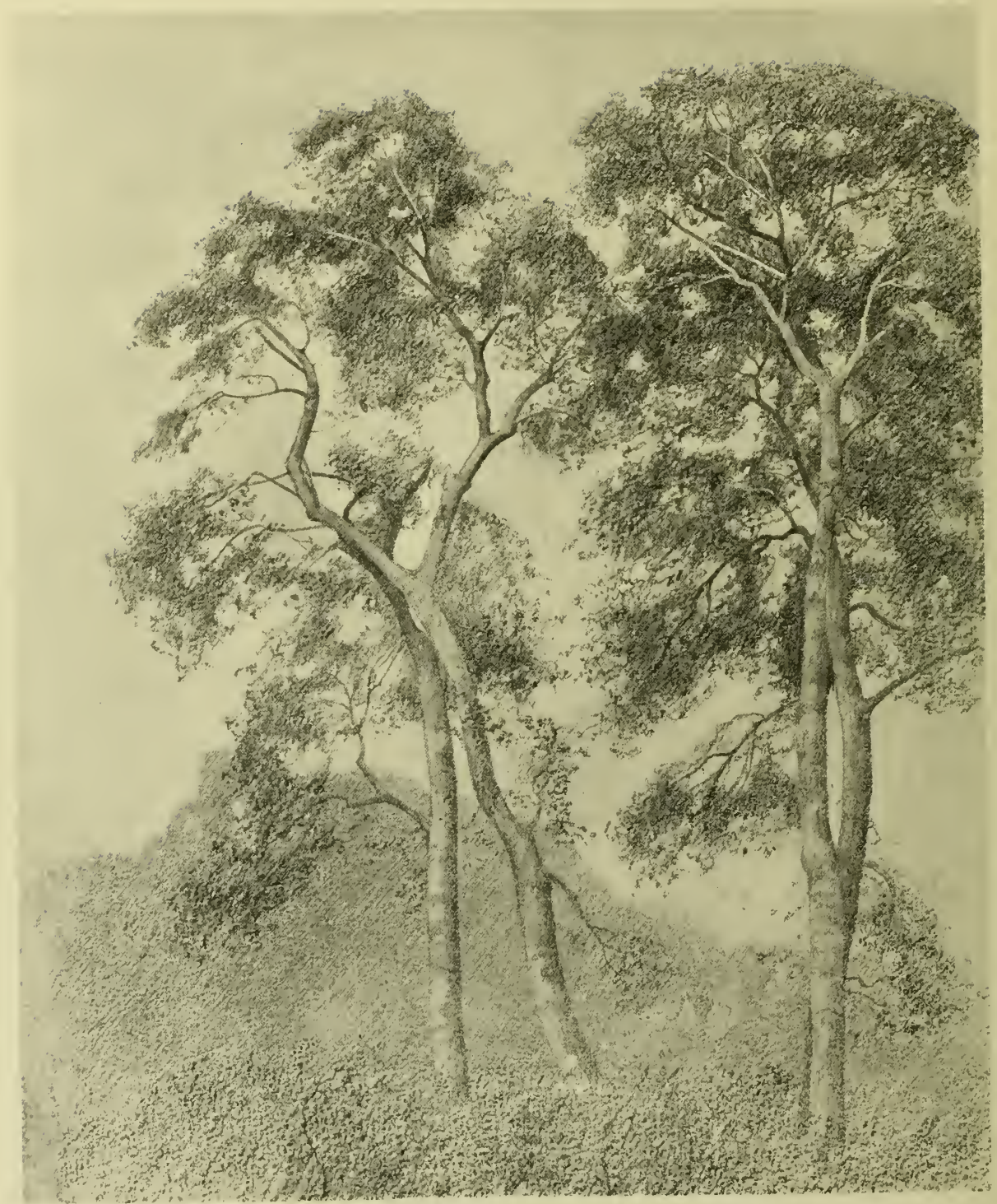
THE CATKINS.

Some trees produce male flowers only, others only female flowers ; the two are never found together on the same tree. The male catkins are about three inches long, and of similar construction to the catkins of the Aspen. They appear before the fertile catkins, usually early in April. The stamens of each little floret on the hanging axis number from six to ten, and are subtended by a hairy bract : the pollen sacs are a purple red and the scales are notched.

The female catkins are so short as to appear nearly oval, and are sometimes erect, sometimes drooping. They have two pistils, each divided into two, which at a hasty glance suggests there being four pistils. The seeds are attached to white cotton tufts, which, after they ripen, cover the catkins and the ground beneath the trees. The scale-bracts of the female flowers are also furnished with long hairs.



THE ASPEN.



OLD ASPENS.

THE ASPEN.

GENERAL REMARKS.



THE wind in the trees, how fascinating and how familiar a sound: less familiar perhaps to some is the thought that every tree yields its leaves and branches to the sport of the winds in a different and a characteristic way. The breeze is very soft and light, not enough to stir a twig, but enough to make the leaves of the Poplars spin in half circles on their thin stalks: their margins, as they sway to and fro, cleave the air now on this side now on that: they dance shimmering in the sunlight; at one moment there is a glint of white from their under-blades and the next a gleam of reflected brightness from the gloss above. A white ripple follows the path of the wind over the willow foliage, as the leaves are upturned and the pliant branches sway and creak. Before rain and storm the Sycamore also turns up the paler tints of its heavy greenery, and the Whitebeam justifies its name. Only the Oak and the Holly are indifferent, and the breezes woo leaf and twig vainly and without response. But the Elm leaves keep together, and move as one on the twig when the gust meets them, and the boughs nod and jog from side to side. So with blurred or sharp leaf-edges, with movements graceful or tremulous, rapid or stately, year in year out, unceasingly, the trees make play with the wind.

THE ASPEN (*Populus Tremula*).

Two forms of the Aspen are commonly found. The one, a small shrubby tree, straggles in hedge and copse, and shows small unpuckered leaves of a light green. The foliage is uniformly smooth, the surfaces neither shining nor woolly, only the upper one slightly darker than the lower. The leaf is about the same size as that of

a birch, and when young, bears some resemblance to it. The twigs are conspicuously slender, and the buds minute.

The other form of the Aspen is a tree of fifty to sixty feet in height, with a trunk blotched with grey and almost destitute of branches except near its apex. The leaves measure two or three inches across: on some trees they have a dark glossy upper-surface, on others a silky under-side; sometimes both surfaces are dull. They are in constant motion, pattering in the slightest breeze. Numerous suckers, with somewhat heart-shaped leaves, spring up round the tree, but where it stands in pasture-land, these are soon demolished by the cattle. Early in the year the branches are hung with downy catkins.

The Aspen grows best in moist soil, though it is found at a high altitude in Scotland. It is a native of this country, and lives about seventy years. The tree is rather shallow-rooted, and the timber has no value on account of its softness and its liability to split, which however make it useful for the construction of light packing-cases. Clog-makers also use it, and when pattens were in vogue, aspen-wood was considered the most suitable material for them, probably on account of its light weight.

THE CATKIN.

Individual specimens of the Aspen bear either male or female flowers, and fertilisation is effected by the agency of the wind. The Aspen is the first of the Poplars to put forth its catkins, and they are usually to be seen by March and appear before the leaves. The flowers of both sexes are very much alike and take the form of hairy catkins: the male catkin may be recognised by the red colouring of its pollen sacs, and when these have opened, by the yellowish-white



CATKINS OF
ASPEN.

pollen, which covers it with dust. The females have branched stigmas, and after fertilisation a tuft of down surrounds the seeds, which appear between the split halves of the stigma.

THE MALE CATKIN.

Towards the end of February, before the leaf-buds show any sign of life, little balls, covered with grey silky down like rabbits' fur, and nearly round, jut out along the twig from brown scales of irregular shape. In the next stage the down has become a lighter and more silvery grey, and the shape of the catkin a blunt oval. It now bends over, and between layers of down the clustered pollen-sacs of the stamens show their rose-vermilion tints, the whole making an exquisite colour-scheme in red and grey. The scales at the base have the hue and polish of a ripe chestnut, while the parts protected during the winter by the overlapping outermost scales show up in a lighter brown and green. When the catkins lengthen, they hang down limply and in a curve, and the florets separate from one another, enabling one to see the pale green of the central stalk to which they are attached. In another week's time the catkins are from two to three inches long, and powdered thickly with white pollen dust, shed by the anthers.

CONSTRUCTION OF THE CATKIN.

The male catkin consists of a green pendent axis two or three inches long. From all sides of it, throughout its length, spring separate florets, each borne on its own short stalk. The male floret consists of a scale to which the stamens, four to eight or twelve in number, are attached, and which is subtended by a deeply indented bract, covered with long hairs. The female catkins are similar in

construction, except that in place of the stamen-bearing scales are found the female organs, enclosed in a capsule from which project the branched stigmas of the ovary. The hairy bract is a feature of both the male and female florets.



THE LEAVES.

The leaf-buds may be distinguished from those which contain flowers by their less ovoid form and their smaller size. In February they are about a quarter of an inch long, and of a dark warm brown colour. They are rather angular than rounded, and set on projecting brackets, the bases of former leaf-stalks. These projections are very conspicuous, as the twigs are otherwise round, not fluted like the terminal twigs of the Black Poplar. The buds do not lie so close



THE YOUNG LEAVES
OF AN ASPEN TREE.

to the twig as do the buds of the Willow, neither are they downy nor covered with gum, like those of the Black Poplar; the terminal bud appears to be usually abortive. The colour of the twigs varies from an olive to grey-brown, and the young shoots are covered with a greyish-white wool. The leaves are also downy when young, and in one variety the mature leaf has a silken coating on its under-surface: it is more usual to find both surfaces of the leaf-blade hairless, and the under surface the lighter in colour. The upper side, which has usually a dull surface not conspicuously dark amongst other trees, is occasionally of a dark glossy green. The ribs project more on the upper side than on the lower, and make a pattern of pale yellow. The leaves are arranged singly from several points on the twig. They are about two inches across, and their outline is nearly round, except for a point opposite the stalk, while the margin is cut into large blunt teeth, unevenly distributed. The leaf-stalk is longer than the leaf, and the portion close up to the leaf-blade is flattened, and blade and stalk set at right angles, which results in a rotary movement when the breeze sways the leaf. The stalk curves over, and most of the leaves are pendent.

THE GREY POPLAR.



GREY POPLAR

THE GREY POPLAR.

GENERAL REMARKS.



DOWN by the waterways where the Poplars live, the grey catkins of the Aspen and the opening buds of the Grey and White Poplars make light patches on the landscape, while the last of the winter floods are held up in the sluices by the brimming river. When the sabre leaves of the flags are well up, woolly white leaves cover the Poplars, and the catkins of the Aspen are replaced by quivering foliage. When great yellow blossoms top the flags and meadow-sweet and flowering rush mark the course of dry ditches, the Poplar leaves are still white above as well as below, and the balsam scent from the Black Poplar gives way to that of new hay. After haytime, when the cattle are turned into the fresh green grass that has sprung up, green tints replace the whiteness on the top sides of the leaves. Those on the suckers not reached by the cattle still bear their coat of whitened wool. Throughout the hot summer the restless Aspen leaves move to breezes we cannot feel, and the purple loosestrife, comfrey, and willow-herb make a garden of the waterways till autumn comes, when single golden leaves hang limply on outlined branches. Once again the sluices overflow, and beds of pale yellow reeds give colour to the winter landscape. At night the Poplars stand out from the rising mist; from overhead comes the sound of fighting ducks. Through the mist the light of a shepherd's lanthorn passes to and fro across the meadows like some will-o'-the-wisp.

THE GREY POPLAR (*Populus Canescens*).

This tree is generally regarded as a variety of the Aspen (to which it bears a marked resemblance), and a native of Britain. It

also resembles the White Poplar, though it is not so tall a tree. The leaves on the suckers especially possess the same pointed shape, and are nearly as white on the underside and as soft from their coating of wool. The leaves on the tree itself bear much likeness to those of the Aspen, and when fully developed are, like them, destitute of the white coating on the underside. They are, however, less susceptible to movement by light winds, for the long foot-stalks, curved in the way peculiar to Poplars, on which they hang, are shorter and rounder in proportion than those of the other tree. The young leaves are not folded in half, or creased like bellows when in bud, as is the case with so many trees, but rolled up in a form which they retain when they first break from the bud-covering. Their autumn colouring is an inconspicuous yellow, and they are often blotted with dark marks.



MALE CATKINS.



FEMALE CATKINS.
(Drawing reduced by one-third.)

THE CATKINS.

The round silver-grey catkins burst out from dark bulging scales, and are practically indistinguishable from those of the Aspen. They have the same downy texture, and gradually curve round from their first erect position till they become pendent. The female flowers have four stigmas, opening into four branches at the tips. The construction of these catkins can be understood by reference to the description already given of those of the Aspen.

THE BARK.

The bark is smooth and stone-coloured, with shades of green and yellow. It is marked with scars similar to those on the trunk of the White Poplar. The knots on the twigs are caused by the projecting scars of the leaf-bases.



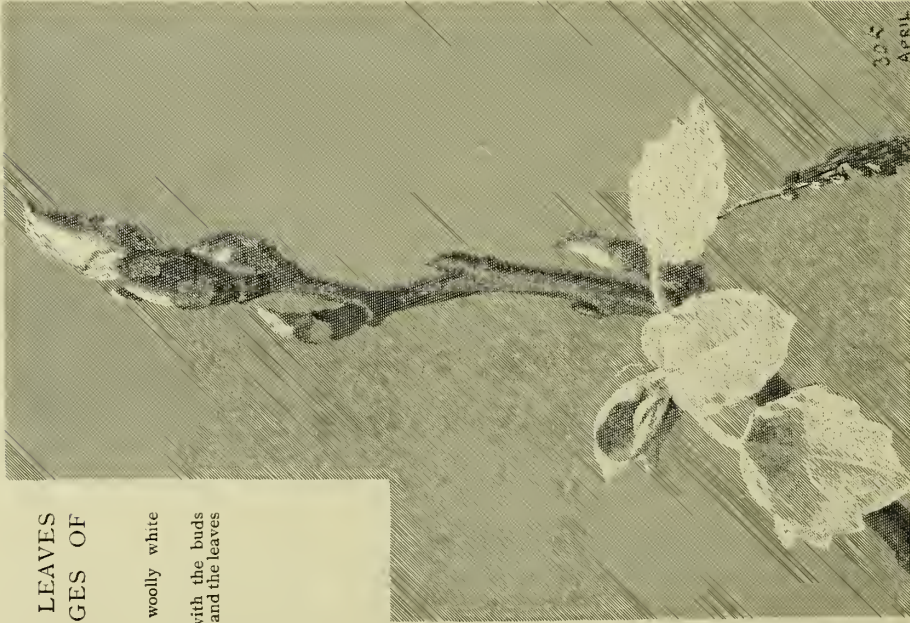
THE YOUNG LEAVES
IN TWO STAGES OF
GROWTH.

A.—A twig with the woolly white
leaves still rolled.

B.—The same twig with the buds
further developed, and the leaves
expanded.



A



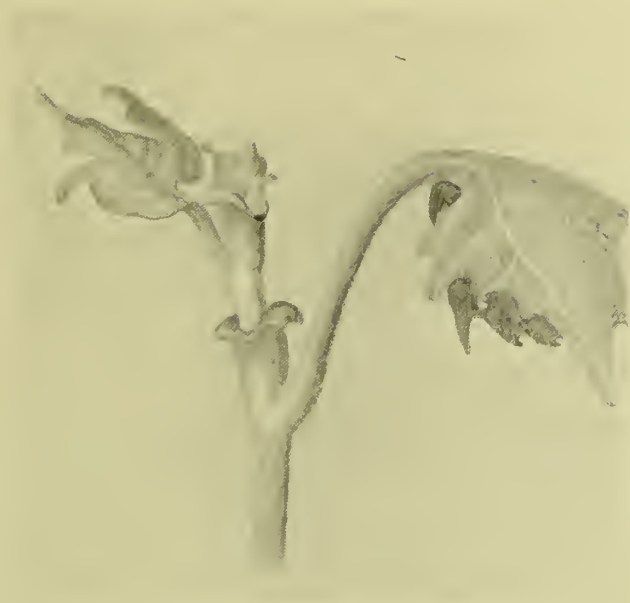
B



BRANCH WITH FOLIAGE.
(Drawing reduced by one-half.)



PLANE TREE.



THE LEAFY CUPS SURROUNDING THE NEW SHOOT.

THE PLANE.



THE Plane recalls no scenes of country life or landscape. To most people the thought of it is inseparable from the life of a city and from a thousand aspects of poverty and wealth. The "Londoner's tree" flourishes in the bare asphalte yard of a City Church, in the trim squares and parks of the West End, along the margins of poor and busy streets. Yet no finer background could be found for the exquisite and intricate pattern of its branches than the flat tones massive buildings supply, and the smoke and vapours which fail to hinder its sturdy growth throw about it such effects of atmosphere as London alone can provide.

One cannot soon weary of the graceful branch-forms, hung with the dark tassels of the seed-balls; of the perfect poise and just proportions of the smooth grey trunk, with the peeling bark continually

renewed, by which it breathes freely even in the smoke-laden air ; of the hollowed leaf-stalks where the buds lie hidden, and the frilled cups which surround the young leaves. The beauties of the Londoner's tree are, indeed, many enough to secure their gratitude and homage.

SPECIES OF PLANES.

Botanists observe two species, namely, the Western Plane (*Platanus Occidentalis*) and the Oriental (*Platanus Orientalis*). The latter is said to have more deeply indented leaves, to shed its bark in smaller sections, and to possess smaller and rougher fruits than the former. Individual trees of the London Plane (*Platanus Orientalis*—variety *Acerifolia*), however, bear both forms of leaves, some cut into three simple lobes, others deeply cleft into three or five, and sub-divided by numerous jagged incisions. The distinctions between the species do not appear to be sufficiently well-marked to call for separate descriptions.

GENERAL REMARKS.—LEAF-BUDS.

The ingenious manner in which young leaves in the bud are packed together has already been referred to in this book. By one common arrangement the folded leaves lie in opposite right-angled pairs. That is to say, where the bud contains four pairs of leaves their positions relatively to one another are those of the four points of the compass : the first and third pair occupying the points north and south, the second and fourth pair the points east and west. This arrangement holds good in the case of the Horse-Chestnut, Ash, Maple, Sycamore, Spindle, Guelder-Rose, and Buckthorn.

In other cases the leaves are in opposite pairs, that is to say,

their position might be represented by two points of the compass, north and south. This happens with the Hornbeam, Beech, Hazel, Lime ; usually with the Chestnut, and often with the Birch. On other trees the leaves are arranged spirally in the bud, so that if our simile of the compass be applied their relative positions would fall at some of the points intermediate between north and south, east and west. The Fir, the Pine, the Larch, the Poplar, Willow, Elm, and Alder ; the Oak, Walnut, Cherry, Apple, and Pear are examples of this.

These broad distinctions are made less simple by differences in the ways the leaves touch one another, and the relative directions in which they face.

The way in which each separate leaf is folded in the bud, so that it may occupy the least possible space, is of greater interest to the general reader, because it affects the whole appearance of the tree when first the young leaves are liberated from the bud. Some leaves, such as those of the Lime, Ash, Oak, Cherry, and Hazel, are folded at the central rib like a sheet of writing paper ; others are folded like a fan, such as the Maple, Hornbeam, Sycamore, Beech, Birch, and Wayfaring tree. Or again the leaves are neither crumpled nor folded, but more or less curved to fit into the dome of the bud : the Fir, the Pine, the Larch, Yews, Hollies, Willows, the Privet and the Spindle tree are examples of this last class.

Yet other questions suggest themselves. Do the leaves wholly or partially overlap one another ? Do they lie with the central rib in a line with the axis of the bud or twisted round it ? So varied and so complicated are the methods by which the leaves find room within the narrow bud-spaces ; yet it must be remembered that each species has its own constant and unvarying plan.

The Poplar, the Apple, and the Pear have the two halves of the leaf-blade rolled up from the outer margins inwards to the central rib, so that each leaf resembles a pair of scrolls of equal size, linked together, the outside of the scrolls being the back of the leaf-blade. The leaf of the Plane is rolled in a similar manner, but in its case the outside of the scrolls is the upper surface of the blade. As the young leaves are only partially unrolled when they emerge from the bud, this characteristic is very obvious. Buckthorn, Plum, and Willow leaves are rolled up like a spill, or a single scroll, from one edge of the blade only, with the under-surface of the leaf outside.

THE BRANCHES AND TRUNK.

A twig of the Plane has the same zig-zag line as is found on the Elm, Hornbeam, Lime, and Beech, and, as in their case, the buds are arranged on it singly. The flat layers of twigs, which are so marked a feature in the ramification of the three trees last-named, are, however, less usual





LEAF STALK CUT TO SHOW THE BUD THAT WAS HIDDEN IN IT.

on the Plane. It differs also from the Elm in its looser carriage, and the freedom with which its branches tend, with many a twist and curve, in every direction. The twigs of one year's growth are olive-green, the older ones dark brown inclining to red, the branches, dark grey. An enlarged joint makes the junction of a year-old shoot with the twig conspicuous. The trunk is cylindrical and massive, and covered with fine grey bark, which flakes off in vertical layers, exposing the smooth surface of the inner bark, where the grey colour is tinged with yellow.

THE LEAF AND BUDS.

In summer-time, when in the axil between leaf-stalk and twig most trees are already showing next year's buds, the Plane keeps them craftily hidden away at the base of the leaf-stalk. There they

lie concealed in a hollow into which they fit after the fashion of a finger-tip into a thimble.

At the fall of the leaf, the bud is exposed, though still amply protected by the scales and stipules which envelop it as if with one or more caps. In spring the expansion of the bud makes the outermost cap (which is smooth and coloured a reddish brown), split open; the inner caps then become visible, and enlarge before splitting in their turn. The first to emerge is covered with a gummy substance, the rest are densely coated with brown fur. A similar coating of dull brown fur attracts one's attention to the young leaves when they appear about the middle of May, as well as the unusual way in which they are rolled round from the two outer margins backwards to the central rib, so that the upper surface of the blade alone is partially visible. Still more unusual is the stipular sheath which surrounds the new shoot like a cup with a frilled margin. The under surface of the leaf is hairy, but greener in colour than the upper surface at this early stage. After expansion the young leaves gradually become flat, and lose their woolly coats. The fully-



developed leaf usually has three lobes, but leaves on the same tree take very various shapes, the plan of which is best explained by the illustrations. The base of leaves with an otherwise serrated margin forms an unbroken line. The upper surface of the blade is a very bright rich and shining green: the under-side is duller and tinted with yellow. The whole leaf lies in one plane, with its surface



THE YOUNG LEAVES AND FRUIT (May 17th).



THE LEAVES PARTLY EXPANDED (May 27th).
(Drawing reduced by one-half).

slightly puckered. The principal ribs are conspicuous on both upper and undersides, and are paler in colour than the blade itself. An average leaf is from six to eight inches long, and is borne on a stalk from one and a half to two inches long, which is usually curved and much swollen at the base, where it has to fit over the bud. The new shoots and the leaf-stalks are pale green, and the latter rather hairy. The leaves lie horizontally, and are drooping.

THE FLOWERS AND FRUITS.

The buds containing flowers are fatter and rounder than the leaf-buds. The outer scales are tinged with crimson, the inner ones, which show when the buds develop, are green and hairy. The greenish yellow catkin-balls, which are made up of either male or female florets packed closely together, have grown early in May to about a quarter of an inch in diameter, and one or more of them hang suspended on a footstalk of about a half an inch long. The balls which contain female florets continue to grow until the diameter of the fruit is about an inch and the length of the stalk four or five inches. Gradually this stalk frays away, and some time during the winter the fruit-ball falls to the ground, where it breaks, and the seed, enveloped in down, is carried away by the wind.

THE PLANE (*Platanus Orientalis*).

This species, of which the "London Plane" is a variety, appears to have been first imported in 1640. The Occidental Plane is, however, mentioned by Loudon before 1548 as growing in this country.



THE FRUIT (July 8th).
(Drawing reduced by one-third.)



A BOUGH WITH THE FOLIAGE
FULLY GROWN (August).



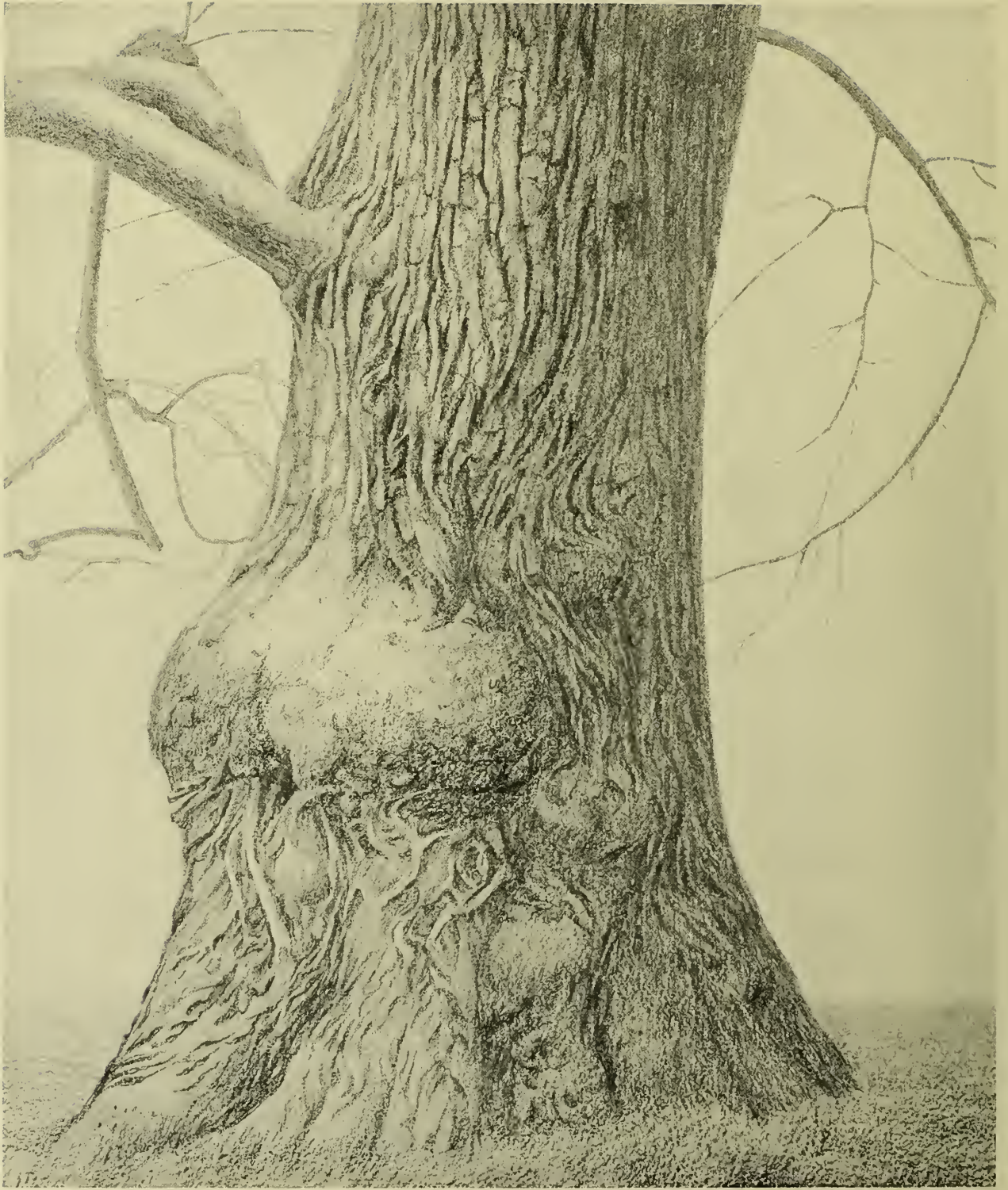
PLAN OF LEAF.
(See over page).



(Drawing greatly reduced.)
Many intermediate forms
between No. 1 and No. 2
are to be found on a single tree.

PLAN OF LEAF.
No. 2.

THE LIME.



THE BOLE OF AN OLD LIME TREE.

THE LIME (OR LINDEN).

GENERAL REMARKS.



LOOK down the long avenue with its boundary lines of fresh green foliage gradually converging, till at the furthest point of the vista one might fancy they met and blended into one. They were wise men in bye-gone days who so often planted lime-trees along their approaches, since the best effect is to be gained by precision and symmetry; there is scarcely another tree which, without the stiff formality of the Spruce, will repeat so exactly, in one specimen after another, the same graceful lines, the bend and recurve of the drooping lower branches. One rank might be but the reflection in a mirror of the opposite rank. And not the man of geometrical tastes only can find satisfaction in the symmetry of the green Lime avenue. There is the vivid translucent green of the young foliage, the delicate beauty and delicious sweetness of the blossom, which comes so late in the season as to make the Lime one of the last among the flowering trees, and its scent the very essence of Summer. A cool and fragrant shade, a soft hum of bees overhead, leaf-shadows stirring and flickering over the road-way: it would be hard indeed to find a pleasanter path in the heat of the day.

THE BRANCHES.

The Lime tree resembles the Beech in the arrangement of the buds, and in the growth of the twig which is continued from a lateral bud, the terminal bud being abortive. The twigs of the Beech, Elm, and Lime all form more or less of a zigzag line between bud and bud.

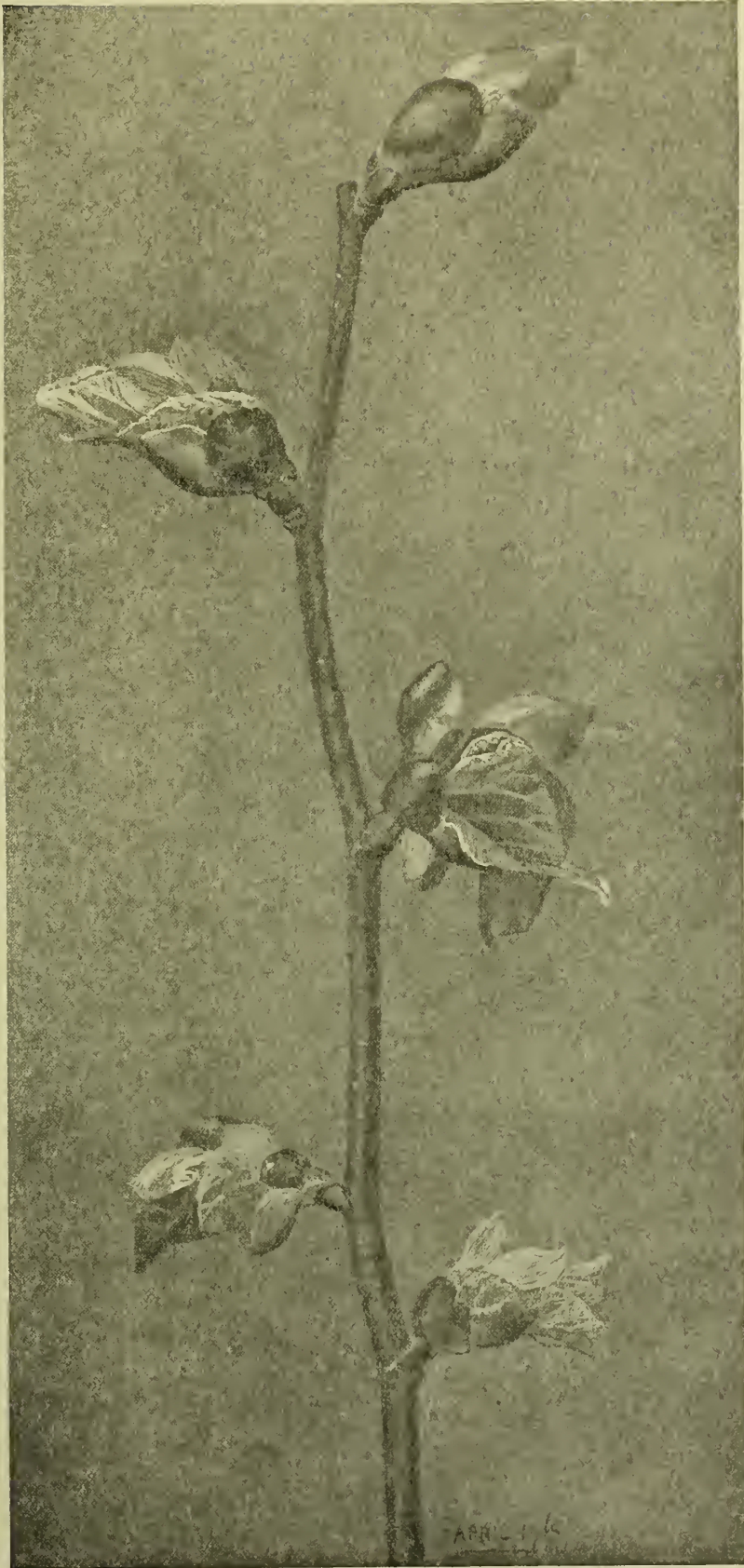
The Lime has a tall straight stem, smooth except at the bole, which can be traced to near the apex of the tree. The boughs are

rather slight in proportion to the trunk, and spring from it at half a right angle, except near the top of the tree, where the angle becomes smaller. The junction between bough and stem is often not clear-cut, but the angle is partially filled in, as if with a wedge. Boughs and branches, except quite at the summit of the tree, are bowed, and end with a curious abruptness; one does not as it were lead on into another, but the continuation of the bough is brought about by a branch springing from near the extremity of its upper side, and of the branch by drooping branchlets, growing in the same manner, which have an upward curve.

THE LEAF.

The buds are set slightly to one side, and not directly above the leaf-scars; in winter they are covered with red-brown scales. When growth begins towards the end of April, the bud pushes out from the tip of the scales, and the green leafy stipules, which are tinted with red where exposed to the light, bulge on either side of it. These stipules enclose the young leaves, folded in half along the mid-rib. The expanding buds turn downwards, and soon the leaves begin to unfold, and to make their way out beyond the stipules, till the young shoot that bears them is seen. It is coloured a pale green, with sometimes a tinge of red, such as the leaf-stalks also have on their upper surface. Before the leaves are fully developed the stipules fall off. The leaves when young are a fresh yellow-green; in August the upper-side takes a soft rather blue-green tint, while the under-side is lighter and clearly patterned by the projecting pale green ribs.

The upper surface is smooth in texture, the lower one resembles it, except for a slight down at the junction of the ribs with the



YOUNG LEAVES BURSTING FROM THE BUDS.



THE SAME LEAVES A WEEK LATER.

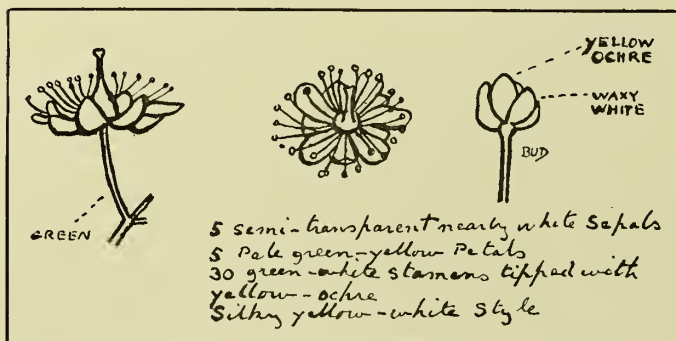


THE MATURE LEAVES.

leaf-stalk. It should be noticed that while the leaf is heart-shaped, one lobe is larger than the other. Before summer has passed the leaves often become sticky and unsightly, and after turning golden for a few days they fall early in the autumn.

THE FLOWER AND FRUIT.

The flower-buds appear about the beginning of June, when the leaves are fully out. The main flower-stalks grow out from the axil



of the leaf-stalks, as well as from the side of the terminal bud; they are two or three inches in length, green, slender, and pendent. From the base to nearly to the tip, the

flower-stalk is attached to the mid-rib of a yellowish-green bract, of a papery texture and nearly transparent, with clearly marked veins; the end of the bract, which has a blunt point, is unattached, and curves backward. The main flower-stalk branches at the tip into several (six to eight) secondary stalks, which radiate from it; they are from half to three-quarters of an inch long, and bear at the tip a round floret-bud, and at the base a pair of tiny colourless stipules, which however fall off before the end of June, when the flowers open.

Each floret has five long cream-coloured petals, set wide apart, so that between them is seen a white waxen sepal. The cluster of stamens springing from inside the base of each petal have white filaments, exceeding the petals in length, and tipped with yellow anther-sacs. The green ovary in the centre of the flower has a stout



THE FLOWER.

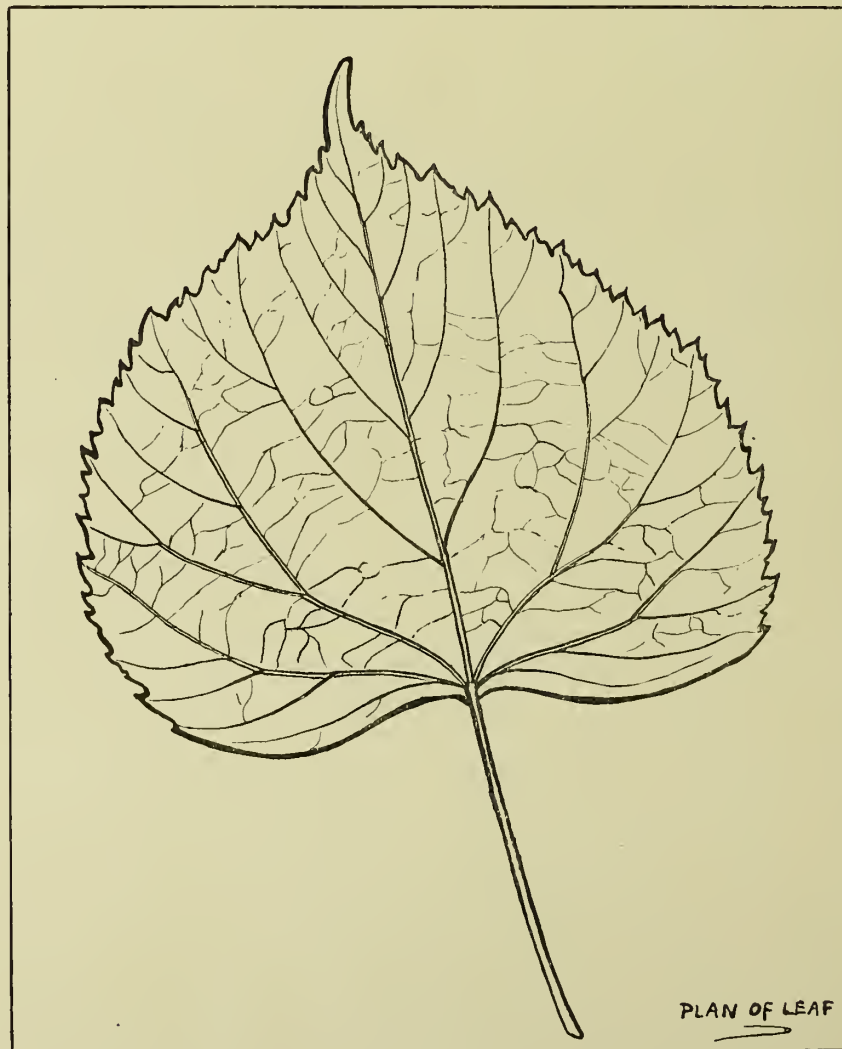


THE FRUIT.

white pistil. The fruits which replace the flowers are fully grown by the middle of August. They are pale-green velvety balls about a quarter of an inch in diameter.

THE LIME. (*Tilia Vulgaris*.)

The Lime reaches a height of seventy to ninety feet. It is one of the longest-lived trees, and does not flower till after its thirtieth year. The timber, which is light in weight and of a fine grain, is used for musical instruments, and bast (the word preserves the Old English name for the lime-tree) is obtained from the inner bark.



THE YEW.

GENERAL REMARKS.—The Age of Trees.



F all our long-lived trees the Yew attains to the most patriarchal age. The Yews of Fountains Abbey, Yorkshire, with their tale of 1,200 years, are still only in middle life compared to the Yew of Fortingale in Perthshire, with its 2,500 years, or to the Brayburn Yew, which according to De Candolle is 3,000 years old. The same authority estimates the age-limit of our different trees as follows. To the Larch he gives 570 years, to the Plane, 750, to the Lime, 1,100, to the Oak, 1,500; but to the Yew from 4,000 to 6,000 years of life. To turn from these abnormal instances to the ordinary limits which are reached by a still vigorous tree, John Nisbet in "British Forest Trees" gives the following table: Seldom over 100 years: Birch, Alder, Willow, Poplar. About 200 years: Ash, Maple, Sycamore, Spruce, Larch, Scots Pine, Hornbeam. 300 to 400 years: English Elm, Beech. 500 years: Yew, Oak, Lime, Scotch Elm, Chestnut. The age of a Yew, it is stated, may be roughly gauged by measuring the bole at a height of about two feet from the ground and allowing for each foot of the diameter about fifty-six years of growth.

RAMIFICATION.

In its most usual form the Yew is a dense massive tree from 20 to 30 feet in height and of greater breadth, with its lower branches extending furthest. Its proportions somewhat resemble those of a hawthorn bush, and might be roughly compared to an equilateral triangle, of which one third, the apex, is cut off by a line

drawn parallel to the base. The comparison takes in the foliage-mass of the tree only : below the base of the triangle and at right angles to it is the trunk, making up a quarter or less of the whole height. The outline so formed is slightly broken by the spires of numerous branchlets. The bole of an old Yew is enormous, sometimes as much as fifty feet in circumference, and is made up of a number of stems fused together and partly hidden by adventitious twigs. These stems separate and diverge as boughs a few feet above the ground. The lower ones soon become horizontal or drooping, with their tips curving upwards. Most of the branches or shoots, though not all, lie horizontally in one plane. The bole is covered with a thin scaly purple-red bark.

The growth of the tree is best understood if a shoot be examined. On shoots of the previous year the buds are grouped near the tip, with here and there a single one in the axils of the leaves. At its extremity such a shoot usually bears three buds, and the resulting branchlets form a three-pronged fork, the lateral branchlets, or outer prongs of the fork being set at an angle of 45° , with the terminal shoot or central prong ; sometimes the bud in the centre of the terminal group is abortive and we have a Y instead of the fork. Owing to the slow growth of the tree these branchlets are very short and set close together, and the leaves, which cover them densely, are also close-set. The parent branches also carry leaves, and a branch of eight or even ten years' growth is not leafless.

The roots which interlace above the ground, as well as the wispy branchlets which straggle from the bole and the stems of which it is built up, often take forms of much beauty. The colouring of the branchlets is yellower in tone than that of the larger limbs.



BOUGH OF YEW.

LEAVES.

The leaves, which are flat and unbroken in outline, measure about three-quarters of an inch in length, and an eighth of an inch in breadth; the breadth is nearly the same throughout, except that the tip and face are bevelled. The texture of the blade is leathery: the upper surface is polished, and its colour a very dark green: the under-side is paler and the green more intense, with a tinge of blue. Usually the leaves are curved so that the under-side forms a concave line, and a very short curved stalk supports them. The tip of the leaf ends in a sharp hard point, and the central mid-rib projects noticeably on the underside. Between the points from which the leaves spring is a raised form resembling a leaf glued to the twig: its colour is usually green like the leaf, but on the older branches and on the upper side of the branchlets it is coloured like the wood which bears it.

Generally speaking the habit of the leaves is to lie in one plane, in two ranks, one on either side of the twig, while usually the twigs lie in the same horizontal plane with the leaves. When the twig is upright, the leaves sometimes radiate from it, star-fashion, on all sides (and this habit of growth is found occasionally on horizontal twigs also). These two contrasting arrangements of foliage—the flat fern-like layer and the star-like radiation from the twig—are rendered possible by the position the leaf stalks occupy. They are not inserted in two rows along the twig* as the flat layers of foliage would lead one to suppose, but spring from it at various points, and so careful is the adherence to the general plan of flat layers of foliage on the horizontal shoots, that leaves, which

* This is sometimes the case, but so far as I have been able to observe, it is exceptional.



can arrive at it in no other way, curve round the twig and so into line with the rest.

The leaves are either set at right angles to the twig, or are slightly inclined towards its apex. The shape of the leaves and their arrangement on the twig enable them to lie so closely together as to form an almost uninterrupted surface. A twig of two inches in length carries about fifty leaves, and exposes about the same area of leaf-surface as a beech twig of equal length which carries but three leaves. On the tips of the twigs there are often clusters of soft leaves crowded together so that they resemble cones. A leaf continues to live from eight to ten years. The leaves of the Yew are poisonous.

FLOWERS AND FRUIT.

Male and female flowers are usually borne on separate trees, though some trees have flowers of both sexes.

The Male Flowers are produced in profusion, but are only conspicuous when the anthers are covered with the yellow pollen. The stamens, several together, project from scales which form a cup



THE FRUIT.

at their base, and which have the appearance of being dead. The whole flower is not more than a quarter of an inch in length.

The Female Flowers. About the end of August the young fruit resembles a blunt acorn of a dark dull-green colour and very hard. The rounded cup in which it is set is paler green and of a consistency that suggests india-rubber; a short stalk attaches it to the twig. The cup develops into a fleshy semi-opaque mass of a beautiful rose-red, which gradually envelopes the nut and enfolds it so completely that only the tip is visible. Cup and seed at first stand out stiffly from the supporting twig, but gradually become pendent as the fruit ripens. The ripe fruits are about three-eighths of an inch in diameter and grow out singly from the twig: sometimes two start from the same point.

THE YEW. (*Taxus Baccata.*)

The wood of the Yew is close-grained, red-coloured, very hard, pliant, and durable. The tree is one of the few evergreens which are natives of Great Britain. It stands clipping well, and in consequence was used in former days to the greatest advantage in making fine hedges, and for quaint representations of birds and animals. Some of these still survive and give character to the old gardens of the period, though too many have been ruthlessly destroyed. Box and Juniper were also used in "topiary" work, which was at its best in the 17th century.



BOLE OF YEW TREE.

BOX TREE.

GENERAL DESCRIPTION.



THE Box is an evergreen tree, and in its natural state reaches a height of about twenty feet. Its stems ramify somewhat abruptly, producing a rounded or flat top of dense leafage, and from top to base the tree is hung with slender branchlets, thickly covered with tiny dark leaves, which sparkle in the sunlight. Here and there a lighter piece of foliage floats out, with its bright leaves as though powdered against the sky ; or lying across a stem somewhat separate from its fellows, accentuates the grace of its line. Standing under this tent of foliage one can better appreciate the fine patterns between the stems, due to the variety of their poise as they rise side by side, now curved, now twisted, into the deep shadow of the greenery overhead.

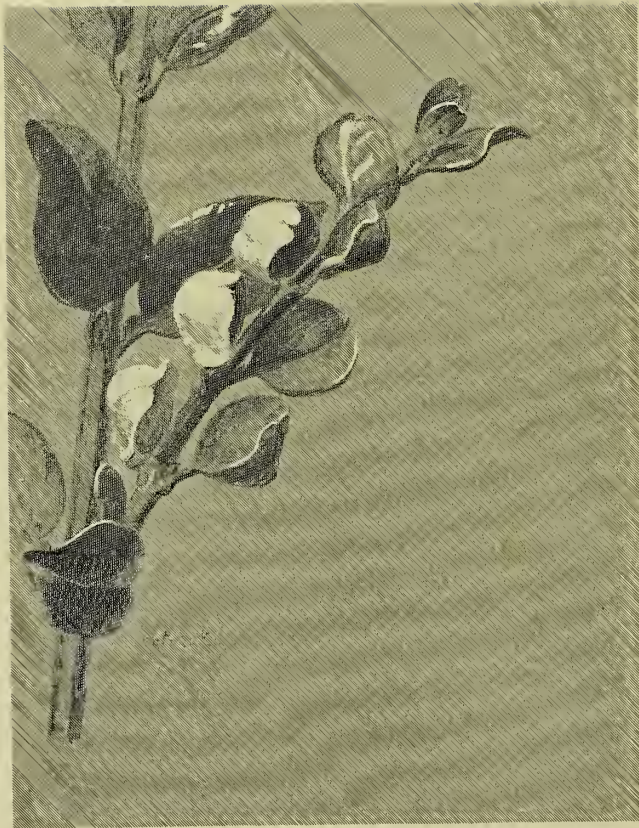
Considering that the girth of the trunk rarely exceeds one and a half feet the bark is moderately rough, and marked with irregular incisions which run vertically.

THE LEAF.

The youngest pair of leaves, while still not fully developed, lie face to face in line with the shoot ; the next pair of leaves in the order of development, which are already beginning to spread outwards from the shoot, are set at right angles to the first pair, and partially enclose them at the base.



The leaf-buds are small and pale-green, and the newly-opened leaves paler than those in maturity, and usually tinged with yellow ; sometimes they have a blueish-green bloom on the surface of the blade. The old leaves



THE LEAVES.



THE FLOWERS.

THE FRUIT.

have a dark green and shining upper surface, on which the mid-rib is prominent, and a paler-green and smooth under-side. The leaves, which in substance are thick, leathery, and opaque, and which have a strong scent, vary very much in form. Some have pointed tips, others notched: some are cup-shaped, others are bowed from tip to base, but have a flat surface: more often the mid-rib is straight and the two edges of the blade up-turned. Though each pair of leaves is arranged on the shoot at right angles to the pair above and below it, the leaves often appear to lie in one plane, forming two ranks on either side of the shoot, like the leaflets of the ash. On account of their short stalks, and the acute angle at

which they are set on the twig, the leaves generally overlap one another. The shoot itself is dull green, and the projecting ribs which run down it, starting from either side of every leaf, make it appear four-sided.

FLOWERS AND FRUIT.

In October the flower-buds are to be found pressed together into a compact little green ball, about one eighth of an inch in diameter, in the axil of the leaf-stalk and the shoot. The flower-buds open in January, or during the four following months. Every cluster of florets usually consists of a female flower surrounded by a number of male flowers. The flowers are a pale greenish-yellow, and inconspicuous until the sulphur-coloured pollen is produced. The male flowers have four petals and four stamens: the female flowers often bear many sepals, surrounding a three-styled ovary. The fruit grows to the size of a large pea. The colour, at first a pale blueish-green, changes later to brown, when the fruit-covering becomes brittle.

THE BOX. (*Buxus Sempervirens*).

The Box grows slowly and lives to a great age. Its pale-yellow wood is heavier than that of any other British tree, and of an exceedingly fine grain. Hence it was used extensively for blocks for wood-engraving. Writers in the reign of Queen Elizabeth mention the Box as growing in England, but botanists disagree as to its being a native tree. The Rev. C. A. Johns says that it was an old custom in the north of England for the mourners to throw a spray of Box on a coffin before the grave was filled in.

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„ Crab Apple - - - -	<i>Pyrus malus</i> - - - -	241—257	I.
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„ Alder Buckthorn - - - -	<i>Rhamnus frangula</i> - - - -	395—401	II.
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„ Sweet (or Spanish) Chestnut - - - -	<i>Castanea sativa</i> - - - -	578—600	II.
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„ English Elm - - - -	<i>Ulmus campestris</i> - - - -	505—528	II.
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Ilex (see Holm Oak)			
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„ - - -	<i>Quercus sessiliflora</i> - - -	106	I.
„ - - -	<i>Quercus pedunculata</i> - - -	106	I.
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„ - - -	<i>Salix purpurea</i> - - -	437, 451—456	II.
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„ - - -	<i>Platanus orientalis acerifolia</i> - - -	684	II.
„ - - -	<i>Platanus occidentalis</i> - - -	684	II.
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„ Aspen	- - - -	Populus tremula	- - - -	663—672	II.
„ Balsam	- - - -	Populus balsamifera	- - - -	629	II.
„ Black	- - - -	Populus nigra	- - - -	625—648	II.
„ Black Italian	- - - -	Populus monilifera	- - - -	629	II.
„ Grey	- - - -	Populus canescens	- - - -	674—681	II.
„ Lombardy	- - - -	Populus fastigiata	- - - -	649—657	II.
„ White	- - - -	Populus alba	- - - -	658—662	II.
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Rowan (or Mountain Ash)	-	Pyrus aucuparia	- - - -	553—566	II.
Sallow (or Goat Willow)	-	Salix caprea	- - - -	457—471	II.
Scots Fir (Scots Pine)	- -	Pinus sylvestris	- - - -	338—361	I.
Silver Fir	- - - -	Abies pectinata	- - - -	347, 348	I.
Sloe (or Blackthorn)	- -	Prunus spinosa	- - - -	39—48	I.
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Spindle Tree	- - - -	Euonymus europæus	- - - -	68—72	I.
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„ Crack Willow	-	Salix fragilis	- - - -	433—448	II.
„ Goat Willow (or Sallow)	-	Salix caprea	- - - -	457—471	II.
„ Osiers	- - - -	Salix viminalis	- - - -	451—456	II.
„ Pollard Willows	-	- - - -	- - - -	449—450	II.
„ White Willow	- - - -	Salix alba	- - - -	433—448	II.
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(For index of trees, see foregoing pages of Index I.—III.)

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ERRATA.

- Page 35, line 8, for "tracts" read "bracts"
- " 47, " 5, " "spine" read "spines"
- " 62, " 19, " "these" read "they"
- " 62, " 25, " "opaque," read "opaque"
- " 67, " 14, " "exceed" read "exceeds"
- " 72, " 2, delete "they"
- " 93, " 8, for "pairs," read "pairs"
- " 106, " 4, " "fruit stalks" read "foot-stalks"
- " 151, " 13, delete "on"
- " 151, " 17, for "lies" read "lie"
- " 151, " 22, " "lower" read "inner"
- " 158, " 14, " "buds" read "bud"
- " 158, " 22, " "bend" read "bends"
- " 162, " 15, " "the" read "its"
- " 208, " 17, " "capule" read "cupule"
- " 210, " 12, " "plain" read "plane"
- " 220, —, " "pendant" read "pendent"
- " 226, " 19, " "wooly" read "woolly"
- " 292, " 18, " "glucous" read "glaucous"
- " 292, " 23, " "years" read "year"
- " 297, " 22, " "desiduous" read "deciduous"
- " 297, " 23, " "of" read "to"
- " 308, lines, 1, 4, 6, for "pedicle" read "pedicel"
- " 312, line 18, for "being" read "berry"
- " 312, " 21, " "possess" read "possesses"
- " 315, " 10, " "silk" read "silky"
- " 316, " 17, delete "as"
- " 316, " 22, for "pendant" read "pendent"
- " 324, " 7, " "pedicle" read "pedicel"
- " 329, title, " "Viburnam" read "Viburnum"
- " 329, line 6, " "answer" read "answers"
- " 340, " 18, " "spared" read "spares"
- " 348, " 19, " "promience" read "prominence"
- " 354, " 5, " "lineal" read "linear"
- " 395, lines, 22 & 23, and page 406 (illustration),
for "Rhamus" read "Rhamnus"
- " 483, line 21, for "Hausman" read "Housman"
- " 600, " 1, " "olburnum" read "alburnum"
- " 607, " 24, " "hemi-sperical" read "hemi-spherical"
- " 630, " 25, " "disappear" read "disappears"



